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Large Car Orders

November Total About 40,000

Very Low Prices for Steel—Greater Activity in Pig Iron and in Finished Material

The placing of large car orders in the past week has brought the total for November close to 40,000, or probably half as many as for all the preceding 10 months of the year. It is expected that orders for as many as 40,000 or more will be given out before the end of the year. Today the car companies have from three to four months orders on their books, while the resulting business to iron and steel manufacturers is only indicated in part by contracts for about 400,000 tons of plates and shapes covering the cars bought on the late movement.

The significance of this car buying is not alone that so much new business has come to iron and steel works, important as that is; what means more is that the railroads bought at the lowest prices in years and that the equipment companies got their steel at the lowest prices on the present downward movement, and that both railroads and car works were convinced that they had bought at the bottom. The ability of the car companies to get better prices on the contracts yet to be placed will show whether even a slight advance from the low level of steel prices is possible.

Buyers of pig iron appear to have taken the large equipment orders as a signal to come into the market, and sales of foundry grades in all districts have been heavier than in a good many weeks. In the Chicago district the total of malleable and foundry irons has been fully 20,000 tons, Milwaukee and Detroit furnaces taking a large share. Buffalo reports 30,000 tons sold, including round lots to Canadian foundries. In New England sharper competition has developed, furnaces competing with Buffalo producers have named delivered prices below the equivalent of \$13 at Buffalo. At Cincinnati sales of Southern iron for early delivery are reported at \$9.75 Birmingham for No. 2 though \$10 holds for the first half of 1912. At Philadelphia an 18,000-ton sliding scale contract for Southern iron, Nos. 2, 3 and 4, was closed by a pipe company. Other pipe interests bought 10,000 tons or more in the East.

The purchase of 25,000 tons of Bessemer iron by a Mahoning Valley steel company is accompanied by the sale of 50,000 tons of ore by the steel company to the furnace company, so that the price does not signify, in the absence of full details. That the steel company needed the iron in the blowing out of a single furnace for relining shows its full operation and the drawing down of pig iron stocks at steel works.

The appearance of the Bethlehem Steel Company as a free seller of pig iron in the East is an important development in a section in which the merchant furnace interests have for a long time found their market more and more circumscribed.

Cast iron pipe foundries have received good inquiries in the past week and there is a distinctly better promise of business for 1912. Two gas companies in New York and one in Philadelphia have asked bids on a total of 23,300 tons.

The recent car buying has brought business not only to plate and structural mills but to foundries, bar mills and bolt and nut works. In the East the last named have bought nearly 30,000 tons of bars in the past week.

In all the encouragement the steel trade has taken from the recent expansion in orders, it has not missed the sobering fact that profits have been sacrificed to tempt buyers into the market. In this connection great interest attaches to the presentation in New York this week of the case of the Mahoning and Shenango Valley iron and steel manufacturers who insist on material reductions in freights on ore, coke and coal.

In the past week 1.05c. Pittsburgh has been more frequently done on bars, while 1.10c. for plates and shapes has been the basis of an increasing share of the business. The chief new contracts of interest to the heavy lines are the new Continental-Commercial National Bank building at Chicago, 20,000 tons, and the Los Angeles aqueduct siphons, which the Riter-Conley Mfg. Company will build, calling for 9400 tons.

The Gulf Refining Company has placed 100 miles of 6-in. pipe at Pittsburgh, deliveries to begin at once.

Tin plate mills have closed large contracts with can manufacturers and meat packers at concessions from the \$3.40 Pittsburgh basis.

The Car Buying Movement

The sharp contrast between the car buying in recent weeks and the slackness in the earlier part of the year is perhaps not fully appreciated. Throughout this year until the closing days of October car buying was of the most desultory character. While precise data have not been compiled, it is certain that orders placed in the entire first half of this year did not materially exceed 50,000, and it is doubtful whether they closely approximated this figure. In the next four months, or until late October, a careful record indicates a total of orders between 20,000 and 21,000. In a trifle over three weeks since then, however, orders have actually been closed for 38,000 cars, while there is inquiry in the market justifying the expectation that as many more will be ordered within a very few weeks. This would make the present movement round up a total of about 75,000 cars, and there are estimates that it will reach 100,000 cars by the end of the year or soon after. In view of a total of less than 75,000 for practically the first ten months of this year, the situation thus shows a complete reversal.

The November figures are perhaps larger by comparison with past performance than is generally assumed. So much has been said of the capacity of individual car plants that in some quarters an exaggerated notion prevails as to the output of the carbuilding industry when it is operating full. Frequently special records have been made by long runs on a special type of car, these records not being indicative of what is done with the normal assortment of orders. From year to year the Railway Age Gazette has secured direct

returns from the car builders of the number of cars built. Its last summary, printed December 30, 1910, is as follows, the totals from 1905 to 1910 inclusive referring to both the United States and Canada, while for previous years they refer to the United States only:

Record of Car Building, 1899-1910.			
	Freight.	Passenger.	Total.
1899.....	119,886	1,305	121,191
1900.....	115,631	1,636	117,267
1901.....	136,950	2,055	139,005
1902.....	162,599	1,948	164,547
1903.....	153,195	2,007	155,202
1904.....	60,806	2,144	62,950
1905.....	165,155	2,551	168,006
1906.....	240,503	3,167	243,670
1907.....	284,188	5,457	289,645
1908.....	76,555	1,716	78,271
1909.....	93,570	2,849	96,419
1910.....	180,945	4,412	185,357

The present car orders should not be compared with these totals, for the reason that the above figures, beginning with 1905, include the Canadian output, and further because they include a considerable quantity for export. The largest year was 1907, and of the 284,188 freight cars there reported only about 265,000 were cars built in the United States for domestic service. In 1910, when the total of freight cars reported was 180,945, the number built in the United States for domestic service was 166,119.

The desultory buying of the first ten months of this year probably represented approximately the rate at which cars were being built, say 1600 cars per week, against 5100 per week in the best year, 1907 (in the United States, for domestic use), and 3200 per week in 1910. Thus the rate in the first ten months of this year represented one-third the rate of 1907, the best year, and one-half the rate in 1910.

The present buying, of course, cannot be reduced to a rate per week, for it represents the placing of orders which will require several months to fill. These orders can, however, be regarded in the light of furnishing so many weeks' work at the 1907 rate. Assuming the present movement to represent 75,000 cars, half of which has been placed in three weeks, there is 15 weeks' work furnished at the rate of production in 1907. It is understood that the railroads are asking for early delivery on the cars being built, and it is well known that at the prices the steel mills are charging the car builders for material, and the margins the car builders are allowing for fabrication, early delivery is being made a condition in the placing of the present orders. The chief interest of the iron and steel market of late has been the question of how the industry would get through the winter, and the provision of perhaps three or four months of practically full work for the car shops is thus of vital importance. The question of what will occur in the car building industry in the spring must be put in the same class with many other interesting questions which industry in its present unsettled state cannot seriously consider.

The present car orders call exclusively for steel or steel underframed cars, which was not the case even a few years ago. According to the authority responsible for the car building figures we have just recalled, only about 72 per cent. of the 1907 output was in all-steel or steel underframed cars. According to the same authority 89 per cent. of the freight cars built in the United States in 1910 were all-steel or steel underframed. The most common weight of freight car today is about 20 net tons, all iron and steel in the case of the "all-steel" cars, and nearly all iron and steel in the case of the steel underframed, for the cars with wooden superstructure are of much greater capacity than the old wooden cars, the substitution of

steel for wood in the underframing making a large increase in the strength.

Thus, if the car building industry is to run at, say, 5000 cars per week this winter the total weight of material involved in the finished product will be about 100,000 net tons per week, fully 90,000 tons being iron and steel, while of this tonnage 50,000 tons or more will be in plates.

Such a tonnage will be most welcome to the iron and steel industry, and it should be borne in mind that the iron and steel demand of the country outside of that emanating from the railroads has had a large increase in the past few years, even though the total consumption has appeared to be about stationary. In the three years of practically full iron and steel activity, 1905-6-7, the average production of pig iron was a trifle less than 25,000,000 tons a year, while the production in 1909, 1910 and the present year averages just a shade above 25,000,000 tons. However, it is fair to estimate that in 1905-6-7 nearly if not quite 10,000,000 tons of pig iron a year found its way into railroad material, while in the three-year period just closing perhaps less than 5,000,000 tons a year has gone into this channel. It is beyond question that in demand outside of that of the railroads there has been a large increase, even though the total demand is not materially changed, and if the railroads make a near approach to their former requirements the grand total is bound to show a large increase.

Prosperous Conditions in Germany

At this time of keen competition among American manufacturers of steel products and of exceedingly low prices to domestic consumers, it is interesting to note the conditions prevailing in the steel trade in Germany. Next to the United States that country is the greatest producer of steel in the world. In neutral markets Germany is a much more formidable competitor of the United States than is Great Britain. Notwithstanding the fact that productive capacity has of late years greatly increased in Germany, perhaps to almost as great a relative extent as in America, the steel works of that country are at present actively employed. Our Berlin correspondent, in his report printed elsewhere in this issue, states that "the market shows an improving tendency; the volume of production is steadily increasing, while prices are firm all along the line and on some products are rising."

The contrast between prices in Germany and in the United States is especially noteworthy. Plates of medium thicknesses are now selling in Germany at 130 marks per metric ton, or about 1.45c. per pound, f.o.b. mill; structural shapes, at 107.50 marks per ton, or about 1.20c. per pound; ordinary Bessemer soft steel bars, 105 marks per ton, or about 1.20c. per pound; open-hearth steel bars, at 110 marks per ton, or about 1.25c. per pound; wire rods, at about \$30.50 per ton. These prices are considerably above the open quotations on similar products in this country. This very satisfactory condition of affairs in Germany is partly due to an active home demand and partly to a good export business, while the government exerts a beneficent rather than a restraining influence. It will be seen from these figures, as compared with American prices, that the tariff at present cuts no figure whatever in influencing prices at American mills. It is also noteworthy that under the Ger-

man fiscal system the recovery of business from the semi-panic conditions prevailing at the time of the dispute with France over the Morocco question has been rapid and complete. Instead of a prolonged depression, such probably as would have been the case under similar circumstances in this country, prosperity reigns and manufacturers have no reason to find fault with trade conditions. The production of pig iron in Germany in October beat all previous records, having been 1,334,941 metric tons, which is 12,800 tons more than for last March, which had been the banner month.

Increasing Cost of Workmen's Compensation

The practical operation of workmen's compensation, as set forth in a British bluebook, shows conclusively that the cost of the system to the employer is increasing with a rapidity which causes some concern. The fact of an increase had been known in a general way, but until now no figures have been available covering the situation with exactness. The figures extend back but three years, but the increase had its beginning in the earlier days of the operation of the system in Great Britain. In the United States much guesswork has been necessary in fixing rates in liability insurance, but the figures are undoubtedly much higher than those which first prevailed in Great Britain. Nevertheless, it is the opinion of some authorities that costs here will advance as time goes on. The lesson of the bluebook is therefore a valuable one.

The growth in premium rates in England is reflected to some extent by the average amount paid as compensation on the returns of persons employed in specified industries during the past three years. For instance, the total charge for compensation in the metal industry (extraction, founding and galvanizing) increased from 6s. 3d. per head in 1908 to 7s. 5d. in 1909, and 8s. 8d. in 1910. In the engine and shipbuilding industries the charge averaged 12s. in 1908 and 12s. 10d. in 1910. The machine, appliances, conveyances and tool industries, which were given for the first time in 1909, increased from 3s. 11½d. to 5s. ¼d. in 1910; the railroads, excluding the clerical staff, from 7s. 7d. per head in 1908 to 8s. 4d. in 1909, and 9s. 4d. in 1910, while in the case of mines the burden for the three years was, respectively, 17s., 20s. 1d., and 20s. 2d. A similar experience has prevailed in other industries. The feeling among British employers is that the augmentation is a very serious matter, and the gravity of the situation is in no ways lessened by the gradual abandonment by workmen of the availability of employers' liability.

No Potential Monopoly in Steel

A well-known New York lawyer, who is spoken of as an expert in corporation practice, said in his testimony before the Senate Committee on Commerce at Washington last week that "the steel trust has the power to produce monopoly but does not use the power; its competitors realize that they are pigmies, but the power to crush them is not used." It will certainly be in the nature of a discovery both to the Steel Corporation and to divers important companies competing with it that it now has or ever had the power to crush its competitors. That the United States Steel Corporation has never attempted to monopolize the American steel trade is not more true than that it could not if it would. The New York lawyer is gifted with some-

what the same type of imagination that inspired the author of a recent work on the American steel trade. The coming supremacy of the Steel Corporation in iron ore was so real to this writer that he was moved to some advance commiseration of the fate of its competitors "expiring beside their exhausted ore pits!" The deliverance of the New York lawyer simply illustrates anew how little account is to be taken of much that is brought out in a political dragnet investigation of an important industrial or economic question.

The Lowness of Steel Prices

Comparison is made by the American Metal Market between the present "composite price" of finished steel products and that of early May, 1911, before the break in prices. The composite price is arrived at by weighting each group of products according to its tonnage importance. Out of 10 pounds of the various products, except rails, bars are credited with $2\frac{1}{2}$ lb., plates with $1\frac{1}{2}$ lb., shapes with $1\frac{1}{2}$ lb., wrought pipe with $1\frac{1}{2}$ lb., wire products with $1\frac{1}{2}$ lb., sheets with 1 lb. and tin plates with $\frac{1}{2}$ lb. On this basis the average price per lb. on January 1, 1911, was 1.74c. The American Metal Market of November 16 says:

"Our composite finished steel is now down to 1.4800c. It dropped to 1.5000c. on November 8, with the declines in plates and shapes, but since then we have marked bars down to 1.05c. and shapes to 1.10c., which takes off 2c. per 100 lb. The prices on which the composite are based are the lowest ruling, these being for very desirable orders for immediate ruling. The market is higher for less desirable specifications and for forward deliveries.

"The 1.4800c. price compares with 1.7600c. in April and the fore part of May, after some slight advances had raised it from 1.7400c., where it stood at the beginning of the year. Thus there has been a decline since early in May of 28c. per 100 lb. or \$5.60 per net ton. The highest level in recent years was 2.075c. at the close of 1907, so that the decline since then has been 59.5c. per 100 lb., or \$11.90 per net ton."

The Pratt & Cady Company's Sales Offices

The Pratt & Cady Company, Hartford, Conn., manufacturer of valves, hydrants, etc., announces that it has established its own sales offices, doing away with the assistance of the Fairbanks Company, which has had the exclusive right to handle the Pratt & Cady products for 28 years. The change has been made necessary by the increase of the business. George L. Spence has been made sales manager, and branch stores have been opened as follows: New York, 259 Canal street, A. M. Page, manager; Boston, 130 High street, W. D. Cashin, manager; Pittsburgh, 321 Third avenue, W. E. Messenger, manager; Detroit, 85 Jefferson avenue, Henry Jeffrey, manager; New Orleans, W. W. Wyneken, manager; Chicago, 157 West Lake street, W. G. Wentworth, manager; Indianapolis, 501 Board of Trade Building, J. M. Goldsmith, manager; Philadelphia, 507 Arch street, McArdle & Cooney, agents; Hartford, 198 Pearl street, Hartford Mill Supply Co., agent.

At a meeting of the directors of the company November 14, John Spencer Camp's resignation as president was accepted. The office of treasurer, which Mr. Camp has held for a long time, was not filled, the intention being to select a Hartford man who has qualifications for the position. George Walworth Hayden was elected president. Mr. Camp's resignation was accepted with regret by the company, but his health will not permit of his continuing in this active work. Mr. Hayden, the new president, entered the employ of the company two years ago as general manager, then becoming vice-president. He has been in the valve business for 23 years, having started with the Crane Company in Chicago, as office boy, working his way up through the different departments, not only in the manufacturing end but in the office as well.

The report that the Valley Mold & Iron Company will start up its Alice furnace at Sharpsville, Pa., in the near future is without foundation.

A New Steel Plant at Cleveland

Corrigan, McKinney & Co., Cleveland, Ohio, who recently secured a site for a steel plant, announce that while plans have not yet been prepared and a definite decision has not been reached as to when the work will be started, its erection will probably be begun early next spring. The land secured consists of 41 acres on the east side of the Cuyahoga River, directly opposite the company's two blast furnaces. It is proposed to build a plant having eventually eight open-hearth furnaces with a capacity of about 1000 tons of steel per day. In addition to scrap the plant will consume the greater part of the output of the company's two River furnaces. One of these furnaces, which was completed about a year ago, has never been blown in. The proposed plant will include a blooming mill for the production of slabs and billets. Nothing has been decided as yet as to finishing mills.

Molders' Safeguards

The American Museum of Safety, 29 West Thirty-ninth street, New York, has issued its Safety Leaflet No. 2, which treats of safeguards for the molder. The illustrations are taken from the collections of the museum and show a protective device for crucibles, and asbestos mittens, leggings and aprons. The former is used in some Continental brass or alloy foundries, and the safety feature is the cover, which is mechanically fastened by a self-locking handle to the crucible after placing it in the shank. The advantages of this cover are the prevention of oxidization, the reduction of fumes to a minimum and the elimination of skimming with the attendant saving in loss in metal due to a graphite lid fastened to the cover. The asbestos mittens, leggings and aprons are especially adapted to foundries making light work, and enable the men to handle the metal more quickly, due to the fact that they know they will not be burned by the spilled metal or their arms blistered by carrying hand ladles. Other safety leaflets showing how to protect employees and render the dangerous parts of machines and processes safe are in preparation.

The Modern Specialties Mfg. Company, manufacturer of hardware and metal specialties, has removed from Milwaukee, Wis., to Goshen, Ind. Its new factory, now completed, has a total floor space of 25,000 sq. ft., and is equipped with the most modern machinery and appliances, having a capacity of 100,000 Modern Make interchangeable self-heating smoothing irons per year. Every part of every iron will be made in the factory, which has ample light on all four sides, is perfectly ventilated, is heated by the most improved methods known to modern construction, and provides every improvement for the comfort and convenience of the employees. It is electrically equipped throughout.

The National Board of Trade will hold its forty-second annual meeting at the New Willard Hotel, Washington, D. C., January 16 to 18, 1912. January 17 will be Corporation Day, when eminent men of affairs are expected to discuss the corporation question in the expectation that preliminary steps will be taken to harmonize the business opinion of the country along lines which will "secure real reforms and hold them." Among the subjects to be considered at this meeting are the banking and currency system, a non-partisan tariff commission and whether the Panama Canal shall be free to coastwise shipping. The secretary of this organization is A. T. Anderson, Maryland Building, Washington, D. C.

The steel and rolling mill plants of the Alan Wood Iron & Steel Company, at Conshohocken and Ivy Rock, above Conshohocken, Pa., and the blast furnaces of the Richard Heckscher & Sons Company at Swedeland, across the Schuylkill River from the Wood plants, are now under one ownership and management, under the corporate title first mentioned. The Richard Heckscher & Sons Company ceases to exist. The merger was formally made at a meeting of the stockholders of both companies November 6.

The Philadelphia Foundry Foremen

The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and Vicinity was held at the Manufacturers' Club, Philadelphia, Pa., on the evening of November 14, with President Clarence R. Brown in the chair. The business of the meeting was deferred to permit the presentation of an address by Dr. Richard Moldenke, secretary American Foundrymen's Association, on "Metal Briquettes: Their Manufacture and Use in Melting Furnaces," illustrated with samples.

In presenting the subject Dr. Moldenke briefly referred to the manufacture of briquettes of iron ore, flue dust, etc., and the development of the process in use for briquetting cast iron borings, turnings, brass, copper and aluminum by pressure without the use of a binder. The development of this process has been quite extensive abroad and it is now being introduced in this country. Sixteen such plants are in operation abroad, with a total capacity of 30,000 to 40,000 tons a year. The manufacture of the cast-iron boring briquettes is conducted in a two stage hydraulic press, in which a pressure of 30,000 lb. per sq. in. is exerted. These presses vary in capacity from 2 to 6 tons per hour. The briquettes weigh from 30 to 35 lb. each, and can be easily handled in charging, without any material loss by breakage. The use of a comparatively uniform size of borings has been productive of the best results, and it was suggested that preliminary grinding would be of advantage. In foreign practice these briquettes have to some extent replaced a considerable proportion of the pig iron charge, but its use in excess of 10 per cent. of the charge was not recommended. The briquettes are porous and thus permit the passage of the gases through the mass. It has been shown that on a full charge of briquettes a loss of about 10 per cent. occurred, but when mixed with an ordinary pig iron charge a loss of but 4 per cent. was experienced. An additional feature is the admixture of steel in the briquettes, thus securing the direct contact of the cast iron and steel in the melting zone of the cupola. Briquettes of steel borings can be used to particular advantage in basic open-hearth furnace practice. The area in the furnace is saved, as is also considerable time in charging. In making briquettes of brass and bronze the ability to charge the compressed metal in the furnace or crucible at one time avoids a large percentage of loss by oxidation.

A general discussion followed on cupola practice. Methods of charging for different purposes and under varying conditions were described and many points of interest in foundry practice were brought out. At the conclusion of the discussion Dr. Moldenke was given a vote of thanks.

Nominations for officers to serve for the ensuing year were made, and the following were duly elected: President, James Whitehead, Abram Cox Stove Company; vice-president, Thomas Smith, Midvale Steel Works; secretary-treasurer, D. M. Kittenger, Pencoyd Iron Works; C. J. Krayner, trustee, to serve for three years.

C. Gorman was elected to active membership in the association. Various reports of committees followed.

The Connellsville Coke Trade

The following report of the Connellsville coke trade is taken from the Weekly Courier, Connellsville, Pa.:

The coke trade is holding its own. This is encouraging in view of the fact that production is approximating 325,000 tons and shipments are close to 10,000 cars per week. Both the merchant and the furnace ovens have approximately 70 per cent. of their ovens in blast, the running order is well maintained and a few ovens are being fired up. Coke men are more hopeful for the future of the trade. The large car orders recently placed by the railroads are counted upon to strengthen the steel situation and reflect some measure of that strength into the coke business. Some fugitive labor needs are reported. One company advertises for men this week to man new ovens being fired. Otherwise, conditions remain the same.

Production made a gain last week of 618 tons as compared with the week before, the total being 323,363 tons as against 322,745 tons. The furnace ovens lost 3172 tons, while the merchant ovens gained 3790 tons.

Of the 16,057 furnace ovens in operation, 60 ran seven

days; 1188 ran six days; 14,189 ran five days and 620 ran four days.

Of the 10,948 merchant ovens in operation, 8314 ran six days; 2414 ran five days; 150 ran four days and 70 ran three days.

The number of active ovens in the region was increased by the firing of 81 ovens at Low Phos and 44 at Parshall No. 2, and decreased by the blowing out of 43 at Crystal, making a net increase of 82 ovens.

An Office Lunching Plan

Many manufacturers have found it expedient to furnish a midday lunch for their employees. Most of them charge the actual cost of the lunch to each employee, no matter what position he holds, or serve one on the *à la carte* basis. A unique and very successful plan has been adopted by the Lodge & Shipley Machine Tool Company, Cincinnati, whereby each office employee is furnished a good wholesome meal, for which he pays a price based on the salary he draws. Including the drafting room employees, about 40 persons are daily served a lunch in a residence building adjacent to the company's plant. Each department is accommodated at a separate table, and while all get the same food and service, a clerk or stenographer drawing \$20 a week would only be charged half as much as an employee paid \$40 a week. To avoid information as to salaries becoming public, every employee is furnished a non-transferable coupon book, the price of which is known only to the cashier and the holder of it. These coupons have no date limit and thus if the owner is absent from a meal he does not pay for it.

It is the aim of the company to charge only the actual cost of the lunch, distributing this as outlined above. When guests are present the company's entertainment account is charged with \$1 for each one, the amount being credited to the general expense fund. In this way no employee is called upon to contribute toward entertaining visitors, the amount stated being more than sufficient to cover the cost of the guest's meal.

Bruce-Macbeth Gas Engine Orders

The Bruce-Macbeth Engine Company, builder of vertical multi-cylinder gas engines, Cleveland, Ohio, reports the following sales recently made: One 75 hp. four-cylinder, natural gas, Olympic Theater, Pittsburgh; one 115 and one 35 hp., natural gas, Harshaw, Fuller & Goodwin Company, Elyria, Ohio; 35 hp., natural gas, Prospect Garage, Cleveland; 55 hp., Pittsburgh Steamship Company, Conneaut Harbor, Ohio; 55 hp., direct connected to triplex pump, Bellevue, Ohio, water works; 300 hp., four-cylinder, producer gas, Patapsco Electric & Mfg. Company, Ellicott City, Md., to be used for municipal lighting; 55 hp., natural gas, Canton Lumber Company, Canton, Ohio; 35 hp., Superior Drop Forge & Mfg. Company, Cleveland; 75 hp., producer gas, J. B. Manor & Co., New Market, Va.; 75 hp., four-cylinder, natural gas, Consumers Ice & Cold Storage Company, Lexington, Ky., second order; two 75 hp., for belting to generators, C. L. Flaccus Glass Company, Tarentum, Pa., fourth order; 135 hp., the Exide Battery Depots, Inc., Cleveland, second order; 65 hp., Boston Consolidated Gas Company, Boston, Mass.; 80 hp., Perfection Spring Company, Cleveland, second order; 150 hp., four-cylinder, natural gas, Van Dorn Iron Works, Cleveland; 300 hp., four-cylinder, natural gas, for municipal lighting, Canal Dover, Ohio, second order; 150 hp., natural gas, H. C. Fry Glass Company, Rochester, Pa.; 250 hp., natural gas, Hotel Southland, Dallas, Texas, for elevators and lighting; 65 hp., twin cylinder, natural gas, Niagara Shoe Company, Buffalo, N. Y.; 115 hp., four-cylinder, natural gas, Prairie State Incubator Company, Homer City, Pa.; two 135 hp., Cameraphone Building, Pittsburgh, Pa.; 115 hp., four-cylinder, Consolidation Coal Company, Fairmont, W. Va.; 350 hp., natural gas, Monongah Glass Company, Fairmont, W. Va., sixth order.

The number of idle cars reported by the railroads of the United States and Canada on November 8 was 26,514, which represents an increase of about 6000 cars in the preceding two weeks, the report of October 23 showing a surplus of 20,532. The greater part of the increase is in coal cars.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Nov. 22, 1911.	Nov. 15, 1911.	Oct. 25, 1911.	Nov. 23, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	\$14.90	\$15.00	\$15.00	\$15.50
Foundry No. 2, Valley furnace	13.25	13.25	13.25	14.00
Foundry No. 2 Southern, Cincinnati	13.25	13.25	13.25	14.25
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.00	11.00
Foundry No. 2, at furnace, Chicago	14.00	14.00	14.35	16.00
Basic, delivered, eastern Pa.	14.50	14.50	14.50	14.75
Basic, Valley furnace	12.35	12.35	12.50	13.50
Bessemer, Pittsburgh	14.90	14.90	15.40	15.90
Gray forge, Pittsburgh	13.40	13.40	13.65	13.90
Lake Superior charcoal, Chicago	16.50	16.50	16.50	18.00

COKE, CONNELLSVILLE,

Per Net Ton, at Oven:

Furnace coke, prompt shipment.	1.55	1.55	1.50	1.45
Furnace coke, future delivery.	1.65	1.65	1.55	1.70
Foundry coke, prompt shipment	1.90	1.90	1.80	2.00
Foundry coke, future delivery.	2.10	2.10	2.00	2.10

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	19.00	19.50	20.00	23.00
Open-hearth billets, Pittsburgh	18.50	19.00	19.00	23.00
Forging billets, Pittsburgh	24.00	24.00	24.00	28.50
Open-hearth billets, Philadelphia	21.40	21.40	21.40	25.50
Wire rods, Pittsburgh	25.00	25.50	26.00	28.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.50	14.50	13.50	16.00
Iron rails, Philadelphia	15.50	15.50	16.00	18.00
Car wheels, Chicago	12.00	12.00	12.50	13.50
Car wheels, Philadelphia	11.25	11.25	11.75	13.75
Heavy steel scrap, Pittsburgh	12.00	12.00	12.00	14.25
Heavy steel scrap, Chicago	9.50	9.50	9.50	12.25
Heavy steel scrap, Philadelphia	11.50	11.50	11.75	13.00

FINISHED IRON AND STEEL,

Per Pound to Largest Buyers:

	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.20	1.20	1.20	1.37
Iron bars, Pittsburgh	1.20	1.20	1.20	1.40
Iron bars, Chicago	1.15	1.15	1.15	1.35
Steel bars, Pittsburgh	1.05	1.10	1.10	1.40
Steel bars, tidewater, New York	1.21	1.26	1.26	1.56
Tank plates, Pittsburgh	1.10	1.15	1.15	1.40
Tank plates, tidewater, New York	1.26	1.31	1.31	1.56
Beams, Pittsburgh	1.10	1.15	1.20	1.40
Beams, tidewater, New York	1.26	1.31	1.36	1.56
Angles, Pittsburgh	1.10	1.15	1.20	1.40
Angles, tidewater, New York	1.26	1.31	1.36	1.56
Skelp, grooved steel, Pittsburgh	1.12½	1.12½	1.15	1.25
Skelp, sheared steel, Pittsburgh	1.20	1.20	1.25	1.30

SHEETS, NAILS AND WIRE,

Per Pound to Largest Buyers:

	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	1.85	1.85	1.85	2.20
Wire nails, Pittsburgh	1.55	1.55	1.60	1.70
Cut nails, Pittsburgh	1.50	1.50	1.50	1.60
Barb wire, galv., Pittsburgh	1.85	1.85	1.90	2.00

METALS,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.00	12.75	12.62½	13.00
Electrolytic copper, New York	12.87½	12.62½	12.50	12.87½
Spelter, St. Louis	6.60	6.45	6.20	5.80
Spelter, New York	6.75	6.60	6.35	5.95
Lead, St. Louis	4.27½	4.15	4.15	4.40
Lead, New York	4.35	4.25	4.25	4.50
Tin, New York	43.35	43.15	42.05	36.90
Antimony, Hallett, New York	7.65	7.65	7.70	7.75
Tin plate, 100-lb. box, New York	\$3.64	\$3.64	\$3.64	\$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb. New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903,

or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras:	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in. on one or both legs, ¼ in. and over, 1.10c. to 1.15c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.15 to 1.20
H-beams over 18 in.	1.25 to 1.30
Angles over 6 in.	1.15 to 1.20
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras as per steel bar card Sept. 1, 1909	1.15 to 1.20
Tees, 3 in. and up	1.15 to 1.20
Zees, 3 in. and up	1.10 to 1.15
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909	1.15 to 1.20
Deck beams and bulb angles	1.40 to 1.45
Hand rail tees	1.95 to 2.10
Checkered and corrugated plates	1.95 to 2.10

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gauge, in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 and 10	1.35 to 1.40
Nos. 11 and 12	1.40 to 1.45
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled.

	One Pass.	Three Pass.
Nos. 10 to 12	1.50 to 1.55	
Nos. 13 and 14	1.55 to 1.60	
Nos. 15 and 16	1.60 to 1.65	1.70 to 1.75
Nos. 17 to 21	1.65 to 1.70	1.75 to 1.80
Nos. 22, 23 and 24	1.70 to 1.75	1.80 to 1.85
Nos. 25 and 26	1.75 to 1.80	1.85 to 1.90
No. 27	1.80 to 1.85	1.90 to 1.95
No. 28	1.85 to 1.90	1.95 to 2.00
No. 29	1.90 to 1.95	2.00 to 2.05
No. 30	2.00 to 2.05	2.10 to 2.15

Galvanized Sheets, of Black Sheet Gauge.

Nos. 10 and 11	1.85 to 1.90
Nos. 12, 13 and 14	1.95 to 2.00
Nos. 15, 16 and 17	2.10 to 2.15
Nos. 18 to 22	2.25 to 2.30
Nos. 23 and 24	2.35 to 2.40
Nos. 25 and 26	2.55 to 2.60
No. 27	2.70 to 2.75
No. 28	2.85 to 2.90
No. 29	2.95 to 3.00
No. 30	3.15 to 3.20

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations.

Corrugated Roofing Sheets, Per Square.

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29		\$2.30	23	\$2.35	\$3.45
28	\$1.30	2.45	22	2.55	3.65
27	1.45	2.50	21	2.75	4.00
26	1.55	2.60	20	3.00	4.30
25	1.80	3.00	18	4.00	5.65
24	2.05	3.10	16	4.85	6.45

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$25 to \$25.50. Fence wire, Nos. 9 to 16, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.35; galvanized, \$1.65. Carload lots, to retailers, annealed, \$1.45; galvanized, \$1.75. Galvanized barb wire to jobbers, \$1.85; painted, \$1.55. Wire nails, to jobbers, \$1.55.

The following table gives the price to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 lb.								
Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	....\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10
Galvanized	.. 1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 2, 1911.

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
¾ and ¾ in.	73	53	68	48
¾ in.	74	64	69	59
¾ in.	77	67	72	62
¾ to 1½ in.	80	72	75	67
2 to 3 in.	81	74	76	69

Lap Weld.

1½ and 1½ in.	..	68	61
2 in.	77	70	72
2½ to 4 in.	79	72	74
4½ to 6 in.	78	70	73
7 to 12 in.	76	66	71
13 to 15 in.	52	..	47

Butt Weld, extra strong, plain ends, card weight.

¾, ¾, ¾ in.	70	60	65	55
¾ in.	75	69	70	64
¾ to 1½ in.	79	73	74	68
2 to 3 in.	80	74	75	69

Lap Weld, extra strong, plain ends, card weight.

1½ in.	..	66	60
2 in.	76	70	71
2½ to 4 in.	78	72	73
4½ to 6 in.	77	71	72
7 to 8 in.	70	60	65
9 to 12 in.	65	55	60

Butt Weld, double extra strong, plain ends, card weight.

¾ in.	65	59	60	54
¾ to 1½ in.	68	62	63	57
2 to 3 in.	70	64	65	59

Lap Weld, double extra strong, plain ends, card weight.

2 in.	66	60	61	55
2½ to 4 in.	68	62	63	57
4½ to 6 in.	67	61	62	56
7 to 8 in.	60	50	55	45

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld	will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld, as specified.
2, 2½ to 4 in. Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.	Charcoal Iron.
1½ to 2½ in.	65
2½ in.	67½
2½ to 3½ in.	72½
3½ to 4 in.	75
5 to 6 in.	67½
7 to 13 in.	65

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discounts, lowered by two points.

Pittsburgh

PITTSBURGH, PA., November 22, 1911.—(By Telephone.)

Pig Iron.—Inquiries are out in the local market for 7000 to 8000 tons of basic, malleable Bessemer and foundry iron, but there is little or no inquiry for standard Bessemer. Reports that the Westinghouse Air Brake Company, Wilmerding, Pa., has withdrawn its inquiry for 1000 to 2000 tons each of foundry and forge iron are untrue. This company is still considering the purchase of some iron, but has not come to a decision. Prices of pig iron continue low and show no signs of betterment. We note a sale of 500 tons of basic iron for delivery to a local open hearth steel plant at about \$12.35, Valley furnace, and also a sale of 100 tons of Bessemer iron for prompt shipment at \$14, Valley furnace. We quote: Standard Bessemer iron, \$14; malle-

able Bessemer, \$12.50; basic, \$12.35; No. 2 foundry, \$13.25; gray forge, \$12.50 to \$12.75, all at Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—New inquiry for billets and sheet bars is very dull, consumers being covered by contracts, against which they are specifying at a fairly satisfactory rate. We quote open hearth billets \$18.50 to \$19; Bessemer billets, \$19; open hearth sheet bars, \$19.50 to \$20; Bessemer sheet bars, \$20 to \$20.50, and forging billets, \$24, all f.o.b. cars, makers' mill, Pittsburgh, or Youngstown district.

Merchant Pipe.—The National Tube Company, Pittsburgh, Pa., has received an order from the Gulf Refining Company for 150 miles of 6-in. steel line pipe, deliveries on which will start at once.

Armor Plate.—The Carnegie Steel Company, Pittsburgh, has received an order from the Italian Government for 6500 tons of armor plate, which will be rolled in the armor plate department of the Homestead Steel Works, Homestead, Pa.

(By Mail.)

The report that the Republic Iron & Steel Company has brought 25,000 tons of Bessemer pig iron from the Ohio Iron & Steel Company, Lowellville, Ohio, at \$14.25 at furnace requires some explanation. The Republic Company has sold 50,000 tons of iron ore to the Ohio Company, and has bought 25,000 tons of Bessemer iron from the same company for early delivery, much of this iron being in the furnace yards. The price of \$14.25 at furnace for Bessemer iron is above the market, as it is easily obtainable at \$14. The heavy orders for steel cars and steel rails, together with a generally improved demand for nearly all kinds of finished iron and steel, have put a more cheerful aspect on the iron trade, but the increased volume of business is at the expense of prices, which seem to be seeking steadily lower levels. Pig iron has been about stationary in the past week, but prices on Bessemer and open-hearth billets, structural material, plates and steel bars are weak and slightly lower. Some heavy contracts for tin plate for delivery through the first half and in some cases through all of 1912 have been closed, a part going at the regular price of \$3.40 per base box, while to the very large consumers, such as the can makers and meat packers, the usual differentials have been allowed, as has been customary in the tin plate trade for some years. New demand and specifications for steel bars are better, and the steel bar mills are running at a heavier productive rate than for some time. The sheet mills report a larger volume of business with prices on galvanized sheets firmer, due to the very high spelter market. An immense tonnage of blast furnace coke for delivery in the first half and also through the whole of 1912 is under negotiation, and at least part of this business will be closed this week. The scrap trade is firmer, and some dealers are holding heavy steel scrap at \$12.50, believing that the market will reach that figure in a very short time.

Ferromanganese.—Sales of four or five carloads have been made for reasonably prompt shipment at \$38, Baltimore. Local large consumers are covered for practically all of this year and through the first half of next, and the inquiry is only for small lots. Prices are firm and we quote 80 per cent. for delivery in first half at \$38 to \$38.25, Baltimore, and on small lots for prompt shipment, \$37.50 to \$38, Baltimore, the freight rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—Two cars, or about 60 tons, of 50 per cent. have been sold for prompt delivery at about \$65.50, Pittsburgh. The market is very firm and we quote 50 per cent. at \$65 to \$66. The quotation on 10 per cent. is \$22; 11 per cent., \$23, and 12 per cent., \$24, f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio.

Skelp.—The very low prices now ruling do not seem to be bringing out much new business. A local pipe mill has bought about 1000 tons of narrow grooved steel skelp on the basis of about 1.12½c. at maker's mill. We quote grooved steel skelp at 1.12½c. to 1.15c.; sheared steel skelp, 1.17½c. to 1.20c.; grooved iron skelp, 1.40c. to 1.45c., and sheared iron skelp, 1.60c. to 1.65c., all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—The demand for wire rods is only for small lots for prompt shipment. Consumers are not specifying in a satisfactory way against contracts, and in some cases shipments have been held up entirely. We quote Bessemer, open-hearth and chain rods at \$25 to \$25.50, Pittsburgh.

Steel Rails.—No large orders for standard sections, aside from the 12,000 tons for the Norfolk & Western, have been received by the Carnegie Steel Company, its

orders in the past week having been only for small lots ranging from 200 to 500 tons. In former years the Carnegie Company received the overflow orders of the Illinois Steel Company, but these now go to the Gary mill, thus cutting Pittsburgh out of a good deal of its former rail business. Some large inquiries for light rails are in the market from Southern lumber interests, and the anthracite and bituminous coal mining companies are placing fairly heavy orders. In the past week the Carnegie Company received new orders and specifications for close to 3000 tons of light rails. We quote standard sections at 1.25c. per lb.; 8 and 10-lb., light rails, 1.25c.; 12 and 14-lb., 1.16c.; 16, 20 and 25-lb., 1.12c.; 30 and 35-lb., 1.10c., and 40 and 45-lb., 1.08c., f.o.b. at mill.

Structural Material.—New inquiries seem to have fallen off. The McClintic-Marshall Construction Company has taken 800 tons of bridge work for New York Central extensions and 500 tons for steel buildings for the Newport Rolling Mill Company, Newport, Ky. The Ohio Steel & Wire Company, Warren, Ohio, has placed about 500 tons for steel buildings. Some very low figures are being named on erected work, which it is claimed leave little or no profit. We quote beams and channels up to 15 in. at 1.10c. to 1.15c., the lower price being named only on very desirable orders.

Plates.—While the car orders placed by the New York Central are stated to amount to 17,400, there is a rumor that it has bought 5000 more. The Baltimore & Ohio has placed about 8000 steel cars, of which the Pressed Steel Car Company got 1500 drop-end gondolas; Cambria Steel Company, 2000 all-steel gondolas; the South Baltimore Car Works, 2000 box; Mount Vernon Car Company, 500 box, and Standard Steel Car Company, 2000 all-steel gondolas. The car shops of the Cambria Steel Company are now said to be filled up for the next four months. The cars bought by the New York Central and the Baltimore & Ohio will require a total of nearly 300,000 tons of steel plates and shapes, and probably half of this will be rolled by Pittsburgh mills. The Pressed Steel Car Company has also taken 1000 steel hoppers for the Grand Trunk and 1200 steel hoppers for the Southern. The Carnegie Steel Company is rolling about 3500 tons of plates for a gas holder for the Philadelphia company in this city, and about the same quantity for a gas holder for Detroit, Mich., both jobs going to the Riter-Conley Mfg. Company. The contract for the Los Angeles aqueduct has also gone to the Riter-Conley Mfg. Company and the plates, 9400 tons, will be rolled by the Carnegie Company. The plate mills now have more live orders on their books than at any time for some months. The Homestead mills of the Carnegie Company for the first time in nearly a year are running to practically full capacity. We quote wide and narrow plates at 1.10c. to 1.15c., f.o.b. at mill. On small orders as high as 1.20c. at mill is obtainable.

Merchant Steel.—Orders for merchant steel have been better in the past week than for some time, and specifications against contracts are also coming in at a better rate. Actual orders entered so far this month are fully as heavy as, and perhaps a little larger than, in the same period in October. Prices are lower, and we quote: Iron finished tire, $1\frac{1}{2}$ x $\frac{3}{4}$ -in. and larger, 1.15c., base; planished tire, $\frac{1}{2}$ -in. and larger, 1.35c.; channel tire, $\frac{3}{4}$, $\frac{7}{8}$ and 1-in., 1.65c.; toe calk, 1.70c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.55c.; cutter shoe tapered or bent, 2.15c.; spring steel, 1.75c.; machinery steel, smooth finish, 1.50c., all f.o.b., at mill.

Railroad Spikes.—Railroads are specifying more liberally against contracts than for some time. A Western road has contracted for 6000 kegs, and an Eastern road for 3000 to 3500 kegs. We quote railroad spikes at \$1.40 base for standard sizes in carload and larger lots, f.o.b. Pittsburgh.

Rivets.—The demand for both boiler and structural rivets is slightly better, consumers sending in orders more freely, probably due to the low prices ruling. Specifications against contracts are also reported as coming in better. We quote structural rivets at 1.45c. to 1.50c. and boiler rivets at 1.55c. to 1.60c., f.o.b. Pittsburgh. On a very desirable order for large tonnage, these prices might be shaded \$1 a ton.

Shafting.—New demand and specifications against contracts are heavier. Implement makers are specifying quite freely against contracts, and belated specifications from automobile builders are also coming in. The shafting trade, as regards volume of new business, is therefore better than for some months. We quote cold-rolled shafting at 65 per cent. off in carloads and larger lots and 60 and 10 per cent. off in small lots, delivered in base territory.

Spelter.—The market continues very firm, and the demand is reported heavier than for some time. A local consumer bought last week about 50 tons at 6.50c., East St. Louis, equal to 6.62 $\frac{1}{2}$ c., Pittsburgh. This is the highest price reached in spelter for a long time, and indications are for a still higher market.

Wire Products.—Another reduction has been made of 10c. per keg in cement coated nails. The new demand for wire and wire nails is light, being only for small lots to cover actual needs, and jobbers are not specifying in a satisfactory way against contracts. Prices are weak, and, while \$1.55 on wire nails is the open market, it is stated that in some cases \$1.50 has been done, especially for delivery to Southern points. We quote wire nails at \$1.55; cut nails, \$1.50; galvanized barb wire, \$1.90; painted, \$1.55; annealed fence wire, \$1.35, and galvanized fence wire, \$1.65, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Pipe.—The Gulf Refining Company is reported to have placed 100 miles of 6-in. pipe with a local mill for delivery in 1912. Several other large projects for gas and oil line are under way, but may be held over until next year on account of the late season. The general demand for merchant pipe continues quite active, several mills reporting that their orders sent to the mills for rolling are equal to 75 to 80 per cent. of capacity. Discounts on merchant iron and steel pipe are being quite well maintained, but some low prices are being made on line pipe.

Boiler Tubes.—Orders for locomotive tubes are fairly active, the mills having more business on their books than for some time. The new demand for merchant tubes is dull, and prices continue to be materially shaded.

Sheets.—Specifications against contracts for black and galvanized sheets have been coming in more freely and the volume of current business being placed is also heavier. From the standpoint of tonnage the sheet trade is showing betterment. Some very large consumers are trying to cover their entire requirements through the first half of 1912 at present prices, but as a rule the mills are not willing to sell so far ahead on this basis, believing that with the betterment in demand it will only be a short time until prices improve. The high prices ruling for spelter have made galvanized sheets very firm, and 2.85c. on No. 28 seems to be bottom of the market; on small lots some mills are able to obtain 2.90c. The sheet mills are now operating to between 60 and 65 per cent. of capacity, but this rate promises to be increased in the near future.

Tin Plate.—Some very heavy contracts for tin plate from the can makers and meat packers have been closed in the past two weeks, and a good many large consumers have covered their entire requirements for the first half of 1912. It is stated that most of this business has been placed at \$3.40 per base box for 14 x 20 coke plates, but to the very largest consumers, such as the American Can Company, Continental Can Company and others, the usual differentials have been allowed. The mills are not operating to more than 50 per cent. of capacity, some running at a less rate, but as soon as they commence deliveries on the large contracts for the first half of 1912 their operations will be increased. The American Sheet & Tin Plate Company has started up 15 of the 30 hot tin mills in its Shenango Works at New Castle, Pa., and the other mills may be put on at an early date. We continue to quote coke plates at \$3.40 per base box, 14 x 20, at mill, with the regular differentials of 5c. to 10c. per box to the very largest buyers.

Steel Bars.—The low prices ruling on both iron and steel bars are stimulating new demand to some extent, and makers also report that specifications against contracts for steel bars have been heavy. On several very large contracts for steel bars for delivery through the first quarter 1.05c., at mill, was made, but this was in special cases for large tonnages, the regular market being 1.10c., at mill. New demand and specifications for iron bars are light, but in view of the large car orders recently placed it is expected that some betterment will occur in the near future. We quote merchant steel bars at 1.05c. to 1.10c., the lower price being named only on very desirable orders. Small lots bring 1.15c., at mill. We quote common iron bars at 1.20c. to 1.25c., at mill.

Coke.—A Mahoning Valley furnace interest has closed for 15,000 to 18,000 tons of furnace coke for the first half of 1912 on a sliding scale basis based on 9 tons of coke for 1 ton of Bessemer pig iron, the minimum price on the coke to be \$1.60 per net ton at oven. This business was divided between two local coke interests. Of the other heavy inquiries for furnace coke in the

market, noted in this report last week, none has yet been closed, but several will likely go through before the end of the week. We note sales of 125 cars, or about 5000 tons, of standard grades of furnace coke for prompt shipment at \$1.50 to \$1.55, at oven. We quote standard makes of furnace coke for spot shipment at \$1.55, and for November and December shipment \$1.55 to \$1.60, per net ton, at oven. Standard makes of furnace coke for the first half are held at about \$1.65 to \$1.70. We quote standard makes of 72-hr. foundry coke for spot shipment at \$1.85 to \$2 and on contracts for first half at \$2.10 to \$2.40, per net ton, at oven.

Scrap.—The market on scrap is firmer. While prices are not actually higher some dealers are refusing to sell at prices they would have accepted a week or two ago. A local steel interest is credited with having sold upward of 15,000 tons of heavy steel scrap to consumers at about \$12, delivered, but this report has not been verified. Higher prices are being asked for heavy steel scrap for forward delivery, some dealers holding at \$12.50 minimum. Dealers are quoting as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.	\$12.00 to \$12.25
No. 1 foundry cast.	12.25 to 12.50
No. 2 foundry cast.	11.25 to 11.50
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district.	10.25 to 10.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.50 to 12.75
No. 1 railroad malleable stock.	11.25 to 11.50
Grate bars.	9.00 to 9.25
Low phosphorus melting stock.	15.25 to 15.50
Iron car axles.	20.50 to 21.00
Steel car axles.	16.00 to 16.25
Locomotive axles.	22.00 to 22.50
No. 1 busheling scrap.	11.00 to 11.25
No. 2 busheling scrap.	7.00 to 7.25
Old car wheels.	12.00 to 12.25
*Cast iron borings.	8.50
*Machine shop turnings.	9.00
†Sheet bar crop ends.	13.75 to 14.00
Old iron rails.	14.50 to 14.75
No. 1 wrought scrap.	12.00 to 12.25
Heavy steel axle turnings.	9.75 to 10.00
Stove plate.	9.00 to 9.25

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Chicago

CHICAGO, ILL., November 20, 1911.

The purchase of equipment by the railroads has been responsible for the continuance of a more than normal booking of specifications by the plate, structural and bar mills in the past week. While railroad buying has greatly improved the tone of the market as regards these lines of finished material a slight falling off can be noted in purchases by the general trade. The Pullman Company obtained an increase of its allotment of New York Central cars from 2000 to 3500, and of the orders placed by the Southern and the Baltimore & Ohio railroads the Mount Vernon Car Mfg. Company received 500 from each. Announcement of the purchase of cars by the Chicago & Northwestern, which was in the market for 3300, has not been made, but it is reported that at least a part has been placed with a northern Indiana builder. It is expected that all of the railroads with cars to place will do so promptly in order to anticipate a firmer attitude on the part of the mills as to price of steel products. The inquiry by the Great Northern for 40,000 tons of rails remains open.

Rails and Track Supplies.—The principal Western inquiry for rails, that of the Great Northern for 40,000 tons, remains unplaced. The purchase of 2000 tons by a San Francisco electric system from a local mill is noted and also an order of 1000 tons for the Chesapeake & Ohio. Specifying against contracts for track fastenings has been fair. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts, with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.10½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c., Chicago.

Pig Iron.—Northern pig iron has been quite active for the past ten days and an aggregate of malleable Bessemer and foundry iron close to 20,000 tons has been placed. Of this a considerable portion has been bought in Milwaukee and southern Michigan. Small lots of basic are also noted among the sales. Local furnaces are accepting business for delivery through the first quarter and in a few instances through the first half at current quotations. The low prices being quoted on local iron are operating against activity in Southern iron except for pick-up business in carload and 100-

ton lots. There is of this kind of business a fair volume, however. The market price of Southern iron for prompt shipment continues on the basis of \$10, Birmingham, but weakness is noted where spot shipment business is involved, and offers of less than \$10 are authoritatively reported. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

Lake Superior charcoal.	\$16.50 to \$17.00
Northern coke foundry, No. 1.	14.50 to 15.00
Northern coke foundry, No. 2.	14.00 to 14.50
Northern coke foundry, No. 3.	13.50 to 14.00
Northern Scotch, No. 1.	16.00
Southern coke, No. 1 foundry and No. 1 soft.	14.85
Southern coke, No. 2 foundry and No. 2 soft.	14.35
Southern coke, No. 3.	14.10 to 14.35
Southern coke, No. 4.	13.85 to 14.10
Southern gray forge.	13.60 to 13.85
Southern mottled.	13.60 to 13.85
Malleable Bessemer.	14.35 to 14.50
Standard Bessemer.	17.00
Basic.	14.75
Jackson Co. and Kentucky silvery, 6 per cent.	16.40
Jackson Co. and Kentucky silvery, 8 per cent.	17.40
Jackson Co. and Kentucky silvery, 10 per cent.	18.40

Structural Material.—The contract has been let for the fabrication of 20,000 tons of steel for the new Continental-Commercial National Bank Building in this city, the award going to the American Bridge Company. The actual construction of this building is some distance in the future, and the mills probably will not roll the steel at once. The same company will fabricate 100 tons for a deck girder span for the Spokane, Portland & Seattle Railroad, 146 tons for the Chicago & Alton at Chicago and 509 tons for the Illinois Central at Rockford, Ill. The Riter-Conley Mfg. Company, Pittsburgh, will furnish 9404 tons of material for the Los Angeles aqueduct, and the Pacific Rolling Mill Company was awarded the contract for 1112 tons for the Standard Oil Company's building at San Francisco. Other lettings included 113 tons to the Union Iron Works for a bridge span at San Bernardino, Cal.; 690 tons to the Mosher Mfg. Company, Dallas, Texas, for the Commonwealth National Bank Building in that city; 248 tons to the Decatur Bridge Company for the University of Illinois; 172 tons to the Elkhardt Bridge & Iron Company for the Press street steel shed at New Orleans, La. The aggregate thus placed was 32,494 tons. This tonnage does not relieve the local situation, which from the standpoint of architectural structural tonnage is very quiet. With one exception local fabricators are able to take orders for immediate shipment. Structural mills in this territory have benefited from the car orders placed, and the major portion of current rolling is on specifications for this purpose. There is practically no change in the price situation. Mills are perhaps less eager for the small business, and jobbers are talking a little larger share of this business, for which they are quite anxious. We quote, for plain material, Chicago delivery, mill shipment, 1.33c., and out of store 1.60c.

Plates.—Specifications for plates have been coming in freely and the tonnage has been somewhat above normal. The car building shops continue to be the source of the greater portion of it, although tank makers' orders show a disposition on the part of this class of trade to take advantage of the low prices. While there has been no actual change in market prices, the mills have been so encouraged by the bookings of the past month that the average consumer can hardly buy to as great advantage as a week ago. Delivery on mill shipment where the specifications are normal can be had in 10 days to three weeks. Mills are now increasingly reluctant to extend deliveries on material sold at current prices. We quote for mill shipment, Chicago delivery, 1.33c. and from jobbers' stocks, 1.60c.

Sheets.—Sheet tonnage booked by local mills continues to be very satisfactory. The volume of trade in this line has been well maintained since early fall, indicating a steady business among users. Prices, on the other hand, are such that they yield little or no profit to the mill and at the same time bring pressure upon the seller of the finished product. We quote Chicago prices as follows: Carload lots, from mill, No. 28 black sheets, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.; No. 10 blue annealed, 1.53c. to 1.58c. Prices from store, Chicago, are: No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c.; No. 28 galvanized, 3.35c.

Bars.—Purchases of steel bars aggregated in tonnage one of the largest items of the week. Local competition continues keen and prices have suffered accordingly. Sales apparently were not evenly distributed among the mills, the major portion being taken by one interest. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.18c. to 1.33c.; bar iron, 1.15c. to 1.20c.; hard steel bars rolled from old rails, 1.15c. to 1.20c. From store: Soft steel bars, 1.55c. to 1.60c., Chicago.

Cast Iron Pipe.—At Los Angeles, Cal., the United States Cast Iron Pipe & Foundry Company was the low bidder on 500 tons and this company was also awarded 650 tons for Lincoln, Neb. It is expected that the long deferred award at Muskegon, Mich., will be settled this week. Prospects for the coming season are increasingly encouraging. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$26.50; 6 to 12-in., \$24.50; 16-in. and up, \$24, with \$1 extra for gas pipe.

Old Material.—While there is no change in actual prices of scrap, and apparently there will be none until the prices of new material show some advance, a distinctly firmer attitude is being displayed by the holders of material. There is a fair inquiry from consumers at current quotations, but dealers, in the hope of a rising market based on increased tonnage of finished material now being placed, are reluctant to sell. Railroad offerings of scrap include 1200 tons by the Chicago, Milwaukee & St. Paul, 500 tons by the Chicago & Eastern Illinois and small lots by the Chicago & Alton and the Toledo, St. Louis & Western. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, per gross ton, as follows:

Old iron rails.....	\$14.50 to \$15.00
Old steel rails, rerolling.....	12.00 to 12.50
Old steel rails, less than 3 ft.....	10.75 to 11.25
Relaying rails, standard section, subject to inspection.....	24.00
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	9.50 to 10.00
Frogs, switches and guards, cut apart.....	9.50 to 10.00
Shoveling steel.....	9.00 to 9.50
Steel axle turnings.....	8.00 to 8.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$11.75 to \$12.25
Iron arch bars and transoms.....	13.00 to 13.50
Steel angle bars.....	8.75 to 9.25
Iron car axles.....	16.75 to 17.25
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought.....	10.00 to 10.25
No. 2 railroad wrought.....	9.00 to 9.25
Steel knuckles and couplers.....	9.25 to 9.75
Steel springs.....	9.50 to 10.00
Locomotive tires, smooth.....	13.50 to 14.00
Machine shop turnings.....	5.75 to 6.25
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	7.75 to 8.00
No. 2 busheling.....	5.75 to 6.25
No. 1 boilers, cut to sheets and rings.....	6.50 to 7.00
Boiler punchings.....	12.00 to 12.50
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	9.50 to 10.00
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	7.00 to 7.50

Philadelphia

PHILADELPHIA, PA., November 21, 1911.

While a decidedly more cheerful feeling prevails consumers in this territory have not responded as yet with any marked buying movement; the opinion is widespread, however, that an upward turn is at hand. A somewhat greater volume of business has been transacted, nevertheless, in quite a few lines. Finished material prices are firmer. Buyers are making greater efforts to get contracts for forward delivery placed at current quotations, but sellers usually refuse to consider this class of business. Plate mills are operating on a slightly better basis. In instances recent low quotations for open hearth steel rolling billets have been withdrawn. Sheet mills are much more actively engaged. Cast iron pipe makers have been the larger buyers of pig iron, although stove makers have also taken on some round lots. As a rule prices of foundry grades are inclined toward weakness, although actual concessions have been small. There is no movement in steel making grades. Coke is quiet. Old material, while comparatively dull, is sentimentally stronger.

Iron Ore.—Occasional indefinite inquiry is noted for supplies for next year's delivery, but as buyers' ideas of prices are considerably below those at which business was recently done sellers are making an effort to close business. Importations during the week included 3850 tons of Cuban, 5226 tons of Swedish and 12,300 tons of Newfoundland ore.

Pig Iron.—Cast iron pipe makers have been the most active buyers in this district. One of the leading Delaware River interests has contracted for 18,000 tons of Southern Nos. 2, 3 and 4 foundry, delivery 3000 tons per month, over the next six months, at private terms. The same buyer has taken on several smaller lots of Northern low grade iron, the price in instances being reported as less than \$14, delivered, although that figure represents the general market for Northern low grade iron, delivered here. Another Delaware River pipe foundry has purchased 5000 tons of pipe iron at close to the market. Several 1000-ton lots, as well as smaller

odd lots, have been purchased by the same class of consumers. Stove foundries have also been fairly good buyers; sales of 3000 to 4000 tons in 1000-ton lots, for delivery over the first quarter, are reported, and in instances the \$15, delivered, basis for No. 2 X foundry has been shaded. A comparatively good volume of small lots business is reported in standard analysis foundry irons. The major portion of these transactions are for early shipment, the same urgency for delivery being asked by melters as has been prevalent for the past three or four weeks. Virginia foundry iron continues to be sold in moderate lots, deliveries in but few instances extending beyond the next three months. Stove foundries have also made moderate purchases of Virginia irons, in one case a sale of 400 tons at \$12.50, furnace, being reported. In addition to recent sales of Southern foundry to pipe makers a sale of 900 tons of Southern coke car wheel iron to a consumer in a neighboring city is noted at \$11, Birmingham. Prompt No. 2 Southern foundry is, however, reported easier, and \$9.75, Birmingham, has in some cases been done for prompt iron, with \$10 held by other sellers, the latter price covering deliveries over the first quarter and half of next year. The movement in forge iron has quieted, although several small sales are reported, in one instance, \$14.50, delivered, having been done for Northern rolling mill forge. Steel making grades are dull. There is no inquiry for basic, and while \$14.50, delivered, is nominally quoted this price could no doubt be shaded for early deliveries. Standard analysis low phosphorus iron is weak at \$19.25, delivered, and on close competition could be shaded 25c. a ton. The general market, while covering a somewhat wider scope, is inclined to be weak. There is considerable inquiry for foundry grades for forward shipment, and sellers are more anxious for business, due in a measure to deferred delivery of basic iron, which has handicapped some producers. The open advent in the merchant iron market by the Bethlehem Steel Company, which it is stated will be able to sell a large quantity of pig iron, provided its own requirements do not increase has not strengthened the situation in this district. Reports continue to be heard of possible reductions in active capacity. One large stack, Crane B, of the Empire Steel & Iron Company was blown out last week and at least one other concern promises curtailment. The following range of prices is named for standard analysis irons, delivered in buyers' yards in this district, shipment extending over the next four months:

Eastern Pennsylvania No. 2 X foundry.....	\$14.90 to \$15.25
Eastern Pennsylvania No. 2 plain.....	14.65 to 15.00
Virginia foundry.....	15.00 to 15.50
Gray forge.....	14.25
Basic.....	14.50
Standard low phosphorus.....	19.25 to 19.50

Ferroalloys.—More firmness is shown in the price of ferromanganese, practically every primary seller naming \$38.50, Baltimore, for 80 per cent. English for first half shipment. Occasional small lots of speculative material, on which the above figure is shaded, continue to be heard of. Sales in this district have, however, been extremely light. Following small sales of 50 per cent. ferrosilicon at \$66, prices of this grade have been moved up to \$68, delivered. Furnace ferrosilicon is light in demand and prices are unchanged.

Billets.—Increased inquiry, particularly for forward delivery, has stiffened prices and in instances sellers have withdrawn recent quotations of \$21.40, delivered, for basic open-hearth rolling billets, and are now firmly holding prices for that grade at \$22.40, delivered here. Current orders are small and makers are disinclined to load up order books with business for extended delivery at present prices. The demand for forging billets continues fair; orders are confined to small lots, as a rule, and quotations are unchanged at \$26.50 to \$27.50, delivered, according to specifications.

Plates.—A better run of current business has been coming to mills in this district and makers view the situation more cheerfully. Stronger efforts are being made by consumers to place contracts for large lots for extended delivery, but the mills refuse to consider such business, nor will they meet the extreme low quotations sometimes reported in other districts. Under the circumstances consumers are swelling their current orders and 300 to 500-ton lots, for early shipment, are more numerous. The minimum quotation of Eastern mills is 1.30c., delivered, and that applies on large business, moderate lots commanding 1.35c. to 1.40c., delivered here.

Structural Material.—Recent bookings here have been extremely light. Estimates are being made on several good sized building prospects, but these have been previously reported. Fabricators have taken sev-

eral small jobs, the quantity of material required being over 100 tons in but few cases. The contract for the Bureau of Engraving building at Washington has been awarded to J. Henry Miller, Inc.; about 4000 tons of material will be required, and it is stated that the leading interest is the low bidder on the structural work. Considerable bridge work is being figured on. The demand for plain shapes has been less pronounced and some Eastern mills are less actively engaged. Prices, however, are being maintained at 1.30c., minimum, delivered, and competition is still sharp for what fabricating work is offered.

Sheets.—A sharp increase in the demand is reported. Orders for early shipment have been more numerous and of larger size and Eastern mills' order books are in better shape than for a long time. A strong effort is shown by consumers to contract for requirements three, six and even twelve months ahead, but Eastern makers refuse to consider such business. No. 28 gauge Western sheets are quoted as low as 2c., delivered here, although Eastern mills, making smooth loose rolled sheets, easily obtain $\frac{3}{4}$ c. to $\frac{1}{2}$ c. per lb. advance for such material for early delivery.

Bars.—While there have been occasional round lot orders placed for steel bars at 1.20c., delivered, mills in a number of instances refuse to shade 1.25c., delivered here, for ordinary run of business. The iron bar market is inclined to be quiet; buyers are making efforts to get concessions, but mills are holding pretty firmly at 1.20c. to 1.25c., delivered. No specification has been offered recently, it is reported, which was sufficiently attractive to obtain a concession.

Coke.—While there has been considerable inquiry both for furnace and foundry grades, transactions of any size have been few. Pending contracts for moderate lots of foundry coke have been closed at prices ranging from \$2.15 to \$2.30 at oven, while prompt coke is to be had at \$1.90 to \$2.10, according to grade. Furnace coke for prompt shipment is quoted at \$1.50 to \$1.55 at oven; for forward shipment \$1.65 to \$1.75 is asked. The following range of prices, per net ton, is named for deliveries in this district:

Connellsville furnace coke.....	\$3.65 to \$4.05
Foundry coke	4.15 to 4.50
Mountain furnace coke.....	3.40 to 3.65
Foundry coke	3.95 to 4.40

Old Material.—The market has been very quiet, although there is a strong feeling on the part of merchants that an improvement is in sight and that prices are on bottom. Consumers, however, show but little interest in the situation and continue to make bargain lot purchases. Heavy melting steel has been purchased at \$11.50, delivered, although railroad steel offered recently on railroad lists went, in instances, at better than \$12, delivered. Rerolling rails are somewhat scarce and are now held at \$13.50 to \$14, delivered. No. 1 wrought scrap on railroad lists is reported to have been sold at better than \$14, delivered. The following range of prices about represents quotations at which the ordinary current business for prompt shipment can be done for delivery in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

No. 1 heavy melting steel scrap.....	\$11.50 to \$12.00
Old steel rails, rerolling (nominal).....	12.50 to 13.00
Low phosphorus heavy melting steel scrap..	15.50 to 16.00
Old steel axles.....	17.00 to 17.50
Old iron axles.....	21.00 to 21.50
Old iron rails	15.50 to 16.00
Old car wheels.....	11.25 to 11.75
No. 1 railroad wrought.....	13.75 to 14.25
Wrought iron pipe.....	10.75 to 11.25
No. 1 forge fire.....	9.50 to 10.00
No. 2 light iron (nominal).....	6.00 to 6.50
Wrought turnings	8.00 to 8.25
Cast borings	7.50 to 7.75
Machinery cast	12.25 to 12.75
Railroad malleable (nominal).....	11.00 to 11.50
Grate bars, railroad.....	9.25 to 9.75
Stove plate	9.25 to 9.75

Cleveland

CLEVELAND, OHIO, November 22, 1911.

Iron Ore.—The shipping season on the lakes will practically close this week. Vessels getting their last cargoes are being delayed because of frozen ore and few shipments from the head of the lakes will be made next week. Only two or three cargoes remain to be brought from Escanaba. Some of the furnacemen seem quite confident that ore prices will be lower next year, but ore sellers are silent on this subject. We quote as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—While large inquiries are lacking, there is an improved inquiry for small lots of foundry grades. A fair volume of business was booked during the week for delivery over the remainder of the year and into or through the first quarter, these orders being mostly for 200 tons and under. Large consumers generally are not showing any inclination to buy round lots for extended future delivery. However, we note two 1000-ton inquiries for the first half. One is from a Mansfield stove maker who wants 600 tons of Northern iron and 400 tons of Southern, and the other inquiry, which is from the same city, is for 1000 tons of southern Ohio iron. Foundry stocks are low and furnace shipments are good. One leading local selling agency reports that its November sales will exceed those of any previous month this year. Recent railroad buying has stirred up a limited demand for malleable iron. We quote No. 2 foundry iron at \$12.75, Cleveland furnace, for outside shipment and \$13 at furnace for local delivery. In the Valley No. 2 foundry is quoted at \$13.25 at furnace, but this price might be shaded slightly. We quote as follows for prompt shipment and for the first quarter:

Bessemer	\$14.90
Basic	13.25
Northern foundry, No. 2.....	13.25
Gray forge	12.50
Southern foundry, No. 2.....	14.35
Jackson County silvery, 8 per cent. silicon.....	\$16.55 to 17.05

Coke.—The market is very dull. A local furnace expects to be in the market shortly for its first half requirements. Sales of foundry grades are limited to small lots for prompt shipment. We quote standard Connellsville furnace coke at \$1.55 to \$1.60 for the remainder of the year and \$1.65 to \$1.70 for the first half. Connellsville 72-hr. foundry coke is held at \$1.90 to \$2.15 for prompt shipment and \$2.15 to \$2.40 for contract.

Old Material.—The sentiment in the scrap trade shows considerable improvement, this being due to the increased demand for steel and the more liberal buying on the part of the railroads. The demand, however, is not active. A fair volume of small lot sales is reported, with no sales or inquiries involving large tonnages. Heavy steel scrap is firmer, mills offering at least 25c. a ton more for this grade than a week ago. Some sales in small lots were made at \$11, and it is doubtful if mills can now pick up odd lots at lower prices. Prices on other grades of scrap are unchanged. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$12.25 to \$12.75
Old iron rails	14.00 to 14.50
Steel car axles	17.00 to 17.50
Heavy melting steel.....	11.00 to 11.25
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	11.00 to 11.25
Light bundled sheet scrap.....	9.50 to 10.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$18.50 to \$19.00
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings.....	7.25 to 7.75
No. 1 busheling	9.00 to 9.50
No. 1 railroad wrought.....	11.00 to 11.25
No. 1 cast	11.00 to 11.50
Stove plate	9.00 to 9.25
Bundled tin scrap	11.00 to 11.50

Finished Iron and Steel.—The demand in finished lines appears to show an improvement from week to week. Mill agencies are booking quite a satisfactory tonnage. Orders are coming out for larger lots than a few weeks ago. There is talk among sellers of firmer prices on steel bars, but this so far appears to be mostly a matter of sentiment. While some sellers may not be eager to take on tonnage at the bottom prices that have been prevailing and are quoting 1.10c., Pittsburgh, as their minimum price, steel bars may still be bought at 1.05c. for desirable orders. The demand for plates has improved materially, considerable tonnage having been sold in the local market during the week in lots of around 200 tons. Plate prices are very low. While desirable orders are being taken generally at 1.10c., Pittsburgh, there are reports of this price being shaded to 1.07 $\frac{1}{2}$ c. Structural material is weak and lower prices are reported. The ruling quotation is 1.15c., but it is understood that tonnage has been sold at 1.12 $\frac{1}{2}$ c. and it is believed that a desirable order might bring out a 1.10c. price. Mills are getting a fair volume of structural orders from fabricating shops, but the number of new inquiries for building work is light. The Cleveland Construction Company has placed an order with the Lackawanna Bridge Company for 540 tons for a new power house at Ft. Worth, Texas. An addition to the Hollenden Hotel, Cleveland, will require nearly 1000 tons. The demand for sheets is fairly active, but

the prices that have prevailed for several weeks are no longer being firmly maintained. The recent minimum quotations of 1.85c. for No. 28 black and 2.85c. for No. 28 galvanized are being shaded \$1 a ton by some of the mills. Concessions are being made in the price of forging billets, which are being sold at \$25.50, Cleveland. Local bolt manufacturers report a good demand from railroads for track bolts. Buyers are taking advantage of the low prices now prevailing to place orders for their spring requirements earlier than usual. The demand for iron bars is very light, mills being unable to meet the low prices quoted for steel bars. We quote iron bars at 1.20c., Cleveland.

Cincinnati

CINCINNATI, OHIO, November 22, 1911.—(By Telegraph.)

Pig Iron.—There is a distinct improvement in buying but prices are not so strong as present conditions would seem to warrant. Considerable Southern analysis iron is said to have been placed recently by a few producers around \$9.75 at furnace for prompt shipment, and it is quite probable that most of this iron in a normal period could have been graded as No. 2 foundry. On the other hand, a majority of Southern producers are asking and obtaining \$10 at furnace for their product and recent sales at this price include 500 tons for November-December movement for a nearby melter. Divided about equally between first quarter and first half shipment, the following contracts were recently closed at the prevailing prices: About 300 tons of Southern foundry for a southern Indiana manufacturer; approximately 600 tons each of Southern No. 2 foundry for a northern Ohio and Detroit consumer. A central Indiana firm also contracted for 1500 tons of foundry, about equally divided between Northern and Southern producers. At \$10, Birmingham, 500 tons of No. 2 soft went to a southern Ohio consumer for first quarter shipment. The malleable inquiry from the St. Louis territory previously reported was closed last week, the business going to the Ironton district. A sale of about 18,000 tons of Southern foundry iron for delivery through the next six months is reported by a large local company as having been made to an Eastern pipe maker. Large inquiries are scarce, however, and buyers continue to place their orders without doing much shopping. Malleable is quoted at \$13, Ironton, for any delivery until July 1. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for prompt shipment:

Southern coke, No. 1 foundry and 1 soft..	\$14.00 to \$14.25
Southern coke, No. 2 foundry and 2 soft..	13.25 to 13.75
Southern coke, No. 3 foundry.....	12.75 to 13.25
Southern coke, No. 4 foundry.....	12.50 to 13.00
Southern gray forge	12.50 to 13.00
Ohio silvery, 8 per cent. silicon.....	16.95 to 17.20
Lake Superior coke, No. 1.....	14.70 to 14.95
Lake Superior coke, No. 2.....	14.20 to 14.45
Lake Superior coke, No. 3.....	13.70 to 13.95
Basic, Northern	14.20 to 14.45
Standard Southern car wheel.....	25.50 to 25.75
Lake Superior car wheel.....	19.00

(By Mail.)

Coke.—Furnace coke is more active. About 30,000 tons of Pocahontas 48-hr. was contracted for by a southern Ohio furnace last week, shipments to run through the first half of next year. Other furnace inquiries are being worked on, but so far the buyers and sellers are far apart on the price proposition. Foundry grades are moving well on contracts previously closed, but there is not much new business offering, other than carload quantities to fill in. We continue our quotations of \$1.50 to \$1.55 per net ton at oven for prompt shipment furnace coke in the Connellsville field and \$1.60 to \$1.65 in the Wise County and Pocahontas districts, with contract prices about 10c. to 15c. above these quotations. Foundry coke in all three districts is offered at \$1.90 to \$2 for this year's shipment, with about 25c. per ton added on future contracts, although a few brands bring as high as \$2.35 per net ton at oven.

Finished Material.—Structural material seems to be attracting more attention this week than any of the other finished lines, although only a very small business in beams and channels has actually been consummated lately. Prospects are excellent if all the large buildings now being planned are erected, and there is also considerable bridge work in sight. The retail local warehouse price on steel bars remains around 1.55c. to 1.60c. and on structural material 1.70c., cut to lengths, if desired. The inquiry in practically all finished material lines is improving, and there is also considerable

business that is placed without much shopping round, as is usually the case when mill prices are not firm.

Old Material.—There is no change in the situation, and many buyers are sitting round awaiting future developments. Consumers generally are taking only what they need in the immediate future, and with the exception of No. 1 cast scrap, which is a trifle stronger, all quotations are unchanged. The minimum figures given below about represent what buyers are willing to pay for delivery at their yards in southern Ohio and Cincinnati, and the maximum quotations the selling prices f.o.b. at yards:

No. 1 railroad wrought, net ton.....	\$9.50 to \$10.25
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.50
Burnt scrap, net ton.....	6.25 to 6.75
Old iron axles, net ton.....	16.25 to 16.75
Bundled sheet scrap, gross ton.....	5.75 to 6.50
Old iron rails, gross ton.....	13.00 to 13.75
Relaying rails, 50 lb. and up, gross ton.....	20.75 to 21.50
Old car wheels, gross ton.....	9.50 to 10.25
Heavy melting steel scrap.....	9.25 to 10.00

Birmingham

BIRMINGHAM, ALA., November 20, 1911.

Pig Iron.—The recent heavy buying of railroad equipment has been reflected to an appreciable extent in the volume of inquiry received in this market, especially for forward deliveries, but otherwise the situation is unchanged. Producing interests, without exception, adhere to a basis of \$10, Birmingham, for No. 2 for any shipment prior to July 1, but, even in local territory, where "split" grades could be furnished, spot shipments have been obtained at a concession. Certain large producers still refuse to quote on deliveries further advanced than the first quarter, and one has practically no grades to offer for shipment prior to the second quarter. An addition was made to the available tonnage for spot shipment during the week, however, by the placing on the market of approximately 2500 tons on yards at an idle plant, which had been held for higher prices than now rule. Recent specifications against contract have been unusually heavy and have represented practically all branches of the trade. The large pipe manufacturers are now taking a very liberal tonnage, while shipments to manufacturers of agricultural implements, machine tools and car wheels are heavier. The bulk of the inquiry now pending comes from the class of trade just mentioned, although considerably more interest is manifested by consumers in all lines. Recent sales have consisted mainly of comparatively small lots for prompt delivery, and the aggregate for the week was smaller than that of the week previous. It is understood that the operations of the Anniston Iron Corporation will not be changed as a result of the receivership, thereby removing the likelihood of a smaller rate of production.

Old Materials.—There is as yet no improvement in the demand for any grades, and the market is very weak. Receipts at local yards have been light for many months and stocks are small comparatively, without any special effort being made to increase the holdings of any grade. We note a fair movement to local mills in the past week, but very little demand has come from the Northern and Eastern markets. Dealers' asking prices are unchanged, and we continue to quote as follows, per gross ton f.o.b. cars here:

Old iron axles (light).....	\$12.00 to \$12.50
Old steel axles (light).....	11.00 to 11.50
Old iron rails.....	11.00 to 11.50
No. 1 railroad wrought.....	9.50 to 10.00
No. 2 railroad wrought.....	8.00 to 8.50
No. 1 country wrought.....	6.00 to 6.50
No. 2 country wrought.....	5.50 to 6.00
No. 1 machinery cast.....	8.00 to 8.50
No. 1 steel.....	7.50 to 8.00
Tram car wheels.....	7.00 to 7.50
Standard car wheels.....	9.00 to 9.50
Light cast and stove plate.....	5.50 to 6.00

Cast-Iron Pipe.—A contract for some 600 tons of water pipe for requirement at Los Angeles, Cal., has been awarded the United States Cast Iron Pipe & Foundry Company, and a like amount for Meridian, Miss., has been placed with the American Cast Iron Pipe Company. Inquiries now pending consist mainly of lots of 300 to 500 tons each, among which is the requirement of a Southern railroad system. No change has been made in prices, and quotations are being fully maintained for the small lots offered. It is now probable, however, that addition to the active producing capacity that has been in contemplation for some time will not be made until late in the first half of next year.

This is largely due to the delay in advertising certain large municipal contracts that will of necessity be placed, as well as the failure to develop certain orders for gas mains. We continue to quote the market as follows for water pipe, per net ton f.o.b. cars here: 4 to 6 in., \$23; 8 to 10 in., \$22; 12 in. and over, average \$21, with \$1 per ton extra for gas pipe.

The Eagle Furnace Company, Attalla, Ala., has just blown in its blast furnace on charcoal iron. This plant is in charge of James H. Walker, formerly with the Shelby Iron Company, Shelby, Ala.

St. Louis

St. Louis, Mo., November 20, 1911.

This market continues to show strong evidence that the big buyers are satisfied that the bottom has been reached in prices and that there is no occasion to hold off longer on purchases, at least for the purpose of getting better figures. In spite, however, of the renewal of activity practically nothing is sought for delivery beyond the first quarter of 1912, and there is still insistence upon prompt shipment. The general belief, and it is firmly held, is that the next five months will be pretty lively. Beyond that no one predicts.

Pig Iron.—The large interests are still in the market, though perhaps not so strenuously as at last report. There has been no actual gain in prices, but there is still a firm state of affairs and some furnaces are instructing their representatives to sell no more at present prices. The sales during the past week have run into considerable figures. The deals which can be traced to the activity in car orders will total about 10,000 tons of different grades. One agency here reports sales of 3500 tons of No. 2 and No. 3 Southern, with 1500 tons more already in sight this week. The inquiry noted last week for 1000 tons of malleable developed into orders for 3000 tons of different grades for mixing, for delivery through March. The quoted prices for No. 2 Southern stand at \$10 to \$10.50, Birmingham basis. The small buyers are not in the market and there is no expectation of their early appearance, most of them being pretty well stocked up and carrying over iron purchased some time ago.

Coke.—The tendency in the coke market is to lag considerably behind the pig iron demand at present, consumers evidently being pretty well supplied. One order of 250 tons for first quarter is about as large as any placed, while most of the transactions have been of the hand to mouth order and on an immediate delivery basis. Contract coke is going forward fairly well on specifications. Prices are a bit firmer. For the best 72-hr. selected Connellsville or Stonega the range is \$2 to \$2.40, at oven, according to whether the requirement is for prompt shipment or for delivery through the first quarter and according to the size of the order.

Old Material.—There is an improved feeling in this market. Much of this is due to the improvement in the other branches of trade. No new lists came out during the week, and those which were reported last week went at prices which showed no material change, though they evidenced no tendency to lower the prices. Dealers' prices, f.o.b. St. Louis, per gross ton, we quote as follows:

Old iron rails.....	\$12.00 to \$12.50
Old steel rails, rerolling.....	11.50 to 12.00
Old steel rails, less than 3 ft.....	10.00 to 10.50
Relaying rails, standard section, subject to inspection.....	22.50 to 23.00
Old car wheels.....	11.50 to 12.00
Heavy melting steel scrap.....	10.00 to 10.50
Frogs, switches and guards cut apart.....	10.00 to 10.50

The following prices are per net on:

Iron fish plates.....	\$10.00 to \$10.50
Iron car axles.....	17.00 to 17.50
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought.....	10.25 to 10.75
No. 2 railroad wrought.....	9.25 to 9.75
Railroad springs.....	9.25 to 9.75
Locomotive tires, smooth.....	13.00 to 13.50
No. 1 dealers' forge.....	7.00 to 7.50
Mixed borings.....	5.00 to 5.50
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers cut to sheets and rings.....	7.00 to 7.50
No. 1 cast scrap.....	8.50 to 9.00
Stove plate and light cast scrap.....	7.00 to 7.50
Railroad malleable.....	7.50 to 8.00
Agricultural malleable.....	6.50 to 7.00
Pipes and flues.....	7.50 to 8.00
Railroad sheet and tank scrap.....	7.00 to 7.50
Railroad grate bars.....	6.50 to 7.00
Machine shop turnings.....	6.50 to 7.00

Finished Iron and Steel.—The optimistic feeling in the finished product market is well maintained and the aggregate of business is keeping up to the mark set last week, though none of the individual orders placed is of

very great size. As heretofore the demand is for quick shipment and for specific work. Nothing is going into stock yet. In structural material the biggest order of the week was 900 tons for the new headquarters building of the Laclede Gas Light Company, which went to the Christopher & Simpson Architectural Iron & Foundry Company. Revival of the Barr building deal, with its requirement of more than 10,000 tons, has set the steel representatives to figuring again, this time with belief that it will not be in vain. Bars are in fair demand and the same is true of plates, which have been enlivened somewhat by the car orders. There is no new demand for implement and vehicle material. In standard steel rails there is some interest in some prospective inter-urban construction, but deals have not reached the closing stage. In light rails the coal mines are taking some tonnage, but nothing is going to the lumber roads. Track fastenings are in fair request for the season of the year.

San Francisco

SAN FRANCISCO, CAL., November 16, 1911.

Merchants are endeavoring to reduce their stocks as much as possible before the end of the year, as they are able to get prompt delivery and see no necessity for carrying larger supplies than are required for the current trade. Orders, however, are coming out with increasing frequency, and the consuming demand in some lines appears to be a little better. The improvement is most notable in southern California, though much uneasiness has been caused at Los Angeles by the large plurality polled by the socialists in the municipal primary election. Speculative demand is lacking in all parts of the state, owing mainly to want of confidence in the stability of the market, but the requirements of consuming trades are gradually increasing. Rail orders are coming out in good shape, but structural material remains quiet. The local pig iron situation has not yet been affected by the Chinese revolution, as there is a substantial tonnage of Chinese iron still in transit.

Bars.—While no inquiries of special importance are coming out, the movement in the aggregate is fairly active, the distributive trade in soft steel being fully up to the recent average. The principal demand is for reinforcing material, which continues fairly active notwithstanding the approach of the rainy season. Merchants are ordering frequently, but their purchases are confined to such odds and ends as are required to complete assortments. No large purchases for stock are to be expected until a stronger tone becomes manifest in the Eastern markets. There is comparatively little shading of prices in the jobbing trade, quotations on bars from store, San Francisco, standing as before at 2.c. for steel and 1.90c. for iron.

Structural Material.—The October record in San Francisco was about \$400,000 below that of September, though better than for October, 1910, and some improvement is expected before the end of the year. Figures are being taken on a number of local buildings requiring 100 tons or less, and this class of work is likely to be the principal feature for some time. An inquiry on the Garland Theater at Los Angeles is expected about the first of the year.

Rails.—The movement of standard sections is well maintained, business having been closed in the last two weeks on projects which have been in the market for some time, and there is more inquiry for light rails than for some time. The small distributive trade in light rails, however, remains quiet. Substantial orders have been placed by most of the electric railroads operating in the central valleys, the Vallejo & Northern having closed for about 3000 tons, while the Fresno, Hanford & Summit Lake is said to have ordered 4500 tons, and a smaller lot has been booked for the Tidewater & Southern, running south from Stockton, Cal. There is also some buying by street railroads, and considerable business is expected in the next few months from the Oakland & Antioch and the Santa Fe, Oakland & San Jose. A fairly active movement is also reported in Oregon and Washington.

Sheets.—The local market on galvanized and blue annealed sheets is weak, resale prices having no definite basis, and the movement is of the same limited nature as for some time past. There is more inquiry, however, from the small consuming trade outside of San Francisco, and riveted pipe manufacturers at Los Angeles are buying freely. Merchants are buying nothing beyond actual needs.

Plates.—Aside from the Los Angeles siphon inquiry, there is little feature to the market. The demand

in the oil fields is unusually light, and the movement in other quarters is very moderate. Jobbing prices are steadily maintained.

Merchant Pipe.—There is no life whatever to the oil well supply business, and the outlook in that line is very uncertain, no improvement being likely before the first of the year. Local plumbing supply houses are also keeping out of the market, though small orders from the hardware trade are more numerous than for some time. The principal demand at the moment is in connection with water and gas systems, and some very fair orders in this line have been taken in southern California. The aggregate tonnage, however, is still unsatisfactory.

Cast Iron Pipe.—The general demand is picking up, though small orders are still the rule. The town of Porterville, Cal., is in the market, and inquiries are expected shortly from Venice and Oxnard, Cal. Preparations are being made for further extensions of gas systems in the vicinity of Los Angeles and San Diego. The town of Prince Rupert, B. C., will receive bids November 20 for 1800 tons.

Pig Iron.—Reports from all parts of the coast indicate extremely quiet conditions in the foundry trade, and as most foundries have ample material on hand for all requirements to the end of the year there is no buying of any consequence. Some Chinese pig iron now in transit is expected to arrive about the first of the year, and while little is definitely known of the actual situation at Hankow it is believed that the movement of pig iron from that point will be resumed within 90 days at most. Some Southern iron has been purchased here recently, the price of No. 2 iron, f.o.b. San Francisco, being \$20. Chinese iron is held at \$23, and a range of \$20 to \$23 is quoted on ordinary foundry grades of English and Continental iron.

Old Material.—Scrap of every kind is neglected by all coast buyers. Cast scrap is pressed for sale at low prices, and a heavy tonnage of steel melting scrap would be exported if suitable carriers were available. There is little demand for wrought scrap or old rails, but there are no burdensome accumulations. Prices are quoted as follows: Cast iron scrap, per net ton, \$14; steel melting scrap, per gross ton, \$10.50; wrought scrap, per net ton, \$11 to \$15; reolling rails, per net ton, \$11.

Metals.—A shipment of 75 tons of tin from the new mine at York, near Bering Strait, is due at Seattle in a few days.

W. B. Higgins, assistant manager of the La Belle Iron Works, Steubenville, Ohio, is looking over the coast situation, and announces that a man will shortly be sent out from the main office to take charge of the business of this territory, with headquarters in San Francisco. The line has formerly been handled by the C. W. Pike Company, this city.

The C. W. Pike Company, Postal Telegraph Building, has taken on a new agency to replace that of the La Belle Iron Works, and retains the agency for the Lackawanna Steel Company, which it has held for several years. The company opened a branch office in Los Angeles, November 1, at 421 Walter P. Story Building.

Boston

BOSTON, MASS., November 21, 1911.

Old Material.—The scrap metal market continues its monotonous dullness. No important transactions of any description are reported, nor do the dealers see indications of a change. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel.....	\$9.50 to \$10.00
Low phosphorus steel.....	11.45 to 11.95
Old steel axles.....	14.00 to 14.50
Old iron axles.....	17.00 to 18.00
Mixed shafting.....	12.75 to 13.25
No. 1 wrought and soft steel.....	10.50 to 10.75
Wrought iron pipe.....	8.75 to 9.00
Skeleton (bundled).....	7.00 to 7.50
Cotton ties.....	7.00 to 7.50
No. 2 light.....	4.50 to 5.00
Wrought turnings.....	5.00 to 5.50
Cast borings.....	4.50 to 5.00
Machinery, cast.....	12.50 to 13.00
Malleable.....	9.25 to 9.75
Grate bars.....	6.00 to 6.50
Stove plate.....	8.00 to 8.50

The German Iron Market

BERLIN, November 10, 1911.

The iron market situation shows an improving tendency. The volume of production is steadily increasing and all establishments are very busy, while prices are firm all along the line and on some products they are rising. Several days ago the convention controlling heavy plates raised prices 5 marks (\$1.25) per ton. The export prices of wire rods are several marks higher than in October; but home prices, which will be fixed for the first quarter of 1912 toward the end of the month, will probably remain unchanged. The sales of pig iron for the first quarter of next year are brisk, and it is expected that substantially all orders will have been placed within a week or two. The production of pig iron in October beat all previous records at 1,334,941 metric tons. This was 43,500 tons more than in October, 1910, and 12,800 tons more than for last March, which was till now the month of record production. The current month will probably create a new record, as several furnaces will be blown in next week. Consumers are calling for contract pig iron at a satisfactory rate, and supplies are diminishing rather than accumulating. Scrap iron is in better demand, and prices are somewhat higher. Ore prices continue firm, and there is greater activity in buying foreign ores.

The big establishments of the Union are very busy on semi-finished material and are turning out considerably more than their allotments call for. They have a steady run of foreign business, and numerous new orders of that description are coming forward. Structural shapes have continued active in spite of the advanced season; dealers are trying to replenish their stocks for next spring, and the foreign markets maintain a steady and good demand at firm prices. In shapes for workshops business is very brisk, and in some specialties it is unusually so; prices have hardened to 107.50 to 110 marks for the common sizes. The home rail market is without change, but the foreign markets continue to send in good orders. Considerable quantities of heavy grooved rails have been taken for export, and the home demand is also better.

The heavy plate market continues the most active section of the trade. The mills are working at their fullest capacity, and consumers are trying to get in hurry orders wherever possible. The demand from shipyards continues very active and will doubtless remain so for a long time, as steamship companies are still ordering new vessels. Orders for medium and thinner plates have also undergone a noteworthy increase. Prices for medium thicknesses have stiffened to 130 to 132.50 marks. Prices for thin plates, which have been unsatisfactory for a long time, are now rising a little. The demand for tin and terne plates is also better. There is a considerable export demand for the latter.

Work on bars has increased of late. Dealers who had been holding back with their orders are now placing contracts for delivery to the end of March. There is a good run of orders from both home and foreign markets. Prices are firmer; in very few cases can soft steel bars be bought below 105 marks; the bulk of the home business is done between that figure and 107.50 marks. Open hearth steel bars sell at 110 marks and higher. Bar iron is in heavy demand at firm prices; and an advance is looked for in view of the higher prices of pig iron. The foreign market is taking large quantities. Mills running on bands and hoops are better employed and buyers are coming forward in greater numbers. This is also true of cold-rolled bands, for which there is also a strong foreign demand. There is more life in the market for wire rods, and wire and wire nails are also very active. The big concerns have recently withdrawn their lowest prices for tubes, indicating that this section of the market also, which has been suffering severely from price cutting since the trade combination was dissolved in the summer of 1910, has at last reached better times.

It is reported that the Hoesch Company is about to absorb the Witten Steel Tube Works.

Belgian news continues favorable; prices are still rising.

The Republic Stamping & Enameling Company, Canton, Ohio, which has used J-M asbestos roofing on both flat and saw-tooth construction for more than 12 years, has just contracted for another 600 squares for new buildings. The new plant of the American Steel & Wire Company, at Corey, Ala., is covered with nearly 10 acres of the same roofing. It is one of the products of the H. W. Johns-Manville Company.

Buffalo

BUFFALO, N. Y., November 21, 1911.

Pig Iron.—The market has shown a marked increase in activity for the week and the outlook is very encouraging. The business placed in the week has totaled nearly 30,000 tons for foundry grades and malleable, with 7500 to 10,000 tons pending. Inquiry of large proportions from the Canadian trade has also developed during the week particularly for malleable. With a greater amount of new business in prospect, as a result of the heavy orders for cars, the situation shows a possibility of better prices in the near future. Some furnaces are now holding very firmly to schedule, being comfortably booked for a considerable time ahead, and current shipments on contracts now amount to a large total daily, with correspondingly rapid reduction of stocks. We quote as follows for present and first quarter delivery, f.o.b. Buffalo:

No. 1 X.....	\$13.75 to \$14.00
No. 2 X.....	13.25 to 13.75
No. 2 plain.....	13.00 to 13.50
No. 3 foundry.....	13.00 to 13.25
Gray forge.....	13.00
Malleable.....	13.50 to 14.00
Basic.....	14.00 to 14.25
Charcoal.....	16.00 to 17.25

New York

NEW YORK, November 22, 1911.

Pig Iron.—With increasing business in pig iron, competition has been sharper and contracts have been made for deliveries running through the first half of 1912 at prices fully as low as for early delivery and in some cases lower. The fact is that some furnaces find that the call from their customers for early deliveries will require about all the iron they can make, so that for the little they now sell for this year they ask more than for next year's iron. Current inquiry, formal and tentative, includes one for 5000 tons from a New Jersey works, while a considerable tonnage will probably be taken by a railroad supply company. In the past week sales made through New York offices have included several of 1000 tons each, while a 1500-ton purchase in New England for which local sellers competed went to an outside district. Competition from western Pennsylvania has been rather keener recently and some quotations made in New England by furnaces competing with those in the Buffalo district represented less than the equivalent of \$13, Buffalo. The principal change in the Virginia situation is that furnaces which have quoted \$12.25 at furnace for No. 2 X for this year and \$12.75 for next year, are willing to sell to the end of the first quarter of 1912 at \$12.25. Sales of the week have included iron for a sanitary pipe works and also a considerable tonnage for pipe works on the Delaware River. Little has been done in malleable pig iron. Buffalo furnaces have done quite a little business with Canada in competition not only with Canadian furnaces but with Middlesbrough, England, producers who have a 40 per cent. preferential in tariff, the duty on American iron shipped into Canada being \$2.80. It is being realized more generally that at present prices purchases may safely be made for the first half of next year. A new factor in the Eastern pig iron market is the Bethlehem Steel Company, which announces that it will hereafter be a seller of foundry, basic and Bessemer irons, chiefly through its main office at South Bethlehem, Pa., and its New York and Philadelphia branch offices. Quotations are as follows for northern iron at tidewater: No. 1 foundry, \$15.25 to \$15.50; No. 2 X, \$14.75 to \$15; No. 2 plain, \$14.50 to \$14.75. For southern iron we quote \$15 to \$15.25 for No. 1 foundry and \$14.50 to \$14.75 for No. 2 foundry.

Finished Iron and Steel.—A decided betterment in sentiment due to conditions developed by numerous inquiries from the railroads is the story of the present local situation. There is a feeling that buyers are coming into the market for 1912 requirements in such volume that the prompt deliveries which have been the order of the day will not be forthcoming and while prices may not necessarily stiffen, they will remain decidedly firm against any drop. The conditions may be indicated by the attitude of the purchasing agent of a large company who, while admitting that he recently bought 400 tons of steel bars—incidentally required to meet no other specifications than the usual physical bending tests and a limit of phosphorus content—at 1.05¢ at mill, was doubtful if they could now be bought for less than 1.10¢ at mill. One large producer of steel bars states emphatically that it will not now sell at 1.10¢ beyond December 31, but it is admitted that this

price has been made by others for delivery to April 1, and it is thought that some business may have been placed at this figure for the first half of next year. The plate trade is encouraged by a decided local increase in shipbuilding, but the market remains at last week's figures. The Newport News Shipbuilding & Drydock Company is to build a passenger and freight steamship for the Clyde line, a number of tug boats are being projected and the Lukens Iron & Steel Company is to furnish the 450 tons of plates for a ferryboat being built at Newburgh, N. Y., for the New York Central. The structural field is still dull, very little offering in the apartment house and loft building line which individually makes attractive jobs. One new large offering is being figured, 2500 tons for the Graphic Arts publishing building on West Twenty-fifth street, and the general contract has been placed for the Seneca telephone building in Buffalo with I. S. Rossell, New York. Bar iron business is reported better and carload lots of refined iron have recently been closed at 1.15¢, eastern Pennsylvania mill. The few large size structural jobs closed are: Emmett building, 1800 tons, to the A. E. Norton Company; factory loft building on West Twenty-first street, 600 tons, to the American Bridge Company; Queens County court building, 800 tons, to the Hay Foundry & Iron Works. It is understood that the Wells Brothers Company is general contractor for the Locomobile Company garage and the Bradley Contracting Company has been given the contract for section 13 of the New York subway, involving perhaps 9500 tons of riveted steel work and structural shapes. Quotations are: Steel bars, 1.26¢ to 1.31¢; plates and plain structural material, 1.31¢ to 1.36¢; bar iron, 1.25¢ to 1.30¢, all New York. Plain material and plates from store, New York, 1.60¢ to 1.70¢.

Cast Iron Pipe.—Buyers are coming into the market quite freely for next year's delivery. The tonnage of this character now in sight runs into important figures. The Consolidated Gas Company, New York, wants 15,584 tons of 4 to 48-in. pipe, of which 10,150 tons is 48 in.; the Brooklyn Union Gas Company is inquiring for 3613 tons of 4 to 12 in., principally 6 in.; the United Gas Improvement Company, Philadelphia, is in the market for 4100 tons of 4 to 12 in., principally 6 in., and is expected to buy a considerably larger quantity later. Other gas and some water companies are in the market for smaller quantities, while it is believed that quite a little buying is being done quietly. The pipe situation is much more encouraging than at the corresponding time a year ago. Sentiment among pipe manufacturers has therefore greatly improved and prices are firmer. Carload lots of 6 in. are quoted at \$22 to \$23 per net ton, tidewater.

Old Material.—A considerably improved feeling prevails among dealers although the demand from consumers has increased but slightly. Undoubtedly, however, much old material could be disposed of if dealers were as willing to make concessions as they were two weeks ago. It is felt that the better demand for finished products must shortly lead to heavier requirements for old material and that some advance in prices may then be secured. Meanwhile dealers are not offering their accumulations freely, and those having contracts to fill are losing little time in securing what may be needed to cover anything of which they are short. Cast scrap has shown the most activity of any grade of old material in the past week. Dealers' prices, per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting.....	\$9.25 to \$9.75
Heavy melting steel scrap.....	9.25 to 9.75
Relaying rails.....	20.00 to 21.00
Rerolling rails (nominal).....	11.25 to 11.75
Iron car axles.....	19.00 to 19.50
Old steel car axles.....	13.00 to 15.50
No. 1 railroad wrought.....	11.50 to 12.00
Wrought iron track scrap.....	10.50 to 11.00
No. 1 yard wrought, long.....	10.25 to 10.75
No. 1 yard wrought, short.....	9.25 to 9.75
Light iron.....	2.75 to 4.25
Cast borings, clean.....	5.75 to 6.25
Mixed borings and turnings.....	5.00 to 5.50
Wrought turnings.....	6.00 to 6.50
Wrought pipe.....	8.75 to 9.25
Old car wheels (nominal).....	10.00 to 10.50
No. 1 heavy cast, broken up.....	10.50 to 11.00
Stove plate.....	8.25 to 8.75
Locomotive grate bars.....	8.25 to 8.75
Malleable cast.....	10.00 to 10.50

Ferroalloys.—The ferroalloys market is firm with greater activity in both sales and inquiries. Prices show advances with such tendency to still further increases that some dealers say they are not eager to sell at present rates. Ferromanganese is quoted generally at \$38.50, Baltimore. Sales have been made at that price for future delivery. Some inquiry is made for spot at \$38 to \$38.25. Ferrosilicon is quoted at \$68, Pittsburgh,

although that price is shaded by some dealers. A large steel company in St. Louis and a large manufacturing concern in New York are in the market for next year's supply of ferrosilicon and there are several other inquiries.

Metal Market

NEW YORK, November 22, 1911.

The Week's Prices

		Cents Per Pound for Early Delivery.				Spelter—			
Copper, New York.		Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.	New York.	St. Louis.
Nov.	Lake.								
16.	12.75	12.62½	43.25	4.35	4.25	6.60	6.45		
17.	12.75	12.62½	43.25	4.35	4.27½	6.60	6.45		
18.	12.75	12.62½	....	4.35	4.27½	6.60	6.45		
20.	12.75	12.75	43.50	4.35	4.27½	6.65	6.50		
21.	13.00	12.87½	43.45	4.35	4.27½	6.75	6.60		
22.	13.00	12.87½	43.35	4.35	4.27½	6.75	6.60		

A feature of the week is the advance in prices of copper, lead and spelter. While the advances absorbed attention, the volume of business done does not seem proportionate.

Copper.—The advance in the price of copper is a much discussed subject in the trade. The market is strong, business is pronounced good and the outlook brighter. The domestic demand is good but not unusual. Exports have been a strong feature in the situation. Sellers of copper, it is admitted, are responsible for the advanced quotations, and the foreign advance is regarded as a possible influence. Electrolytic copper is quoted at 13c., delivered in the Naugatuck Valley, cash 30 days, and 12.87½c., New York, with a strong tendency to an immediate advance. Lake copper is 13c. The London copper quotations for spot are £58 15s. and three months, £59 10s. Exports of copper for the month to date are 21,331 tons.

Pig Tin.—A quiet market exists in pig tin, there being less activity than last week, probably a result of recent heavy buying. Supplies are closely held at 43.35c., an advance of ¼c. over one week ago. Delivery into consumption probably will be small this month. November 17 there was a flurry of inquiry, but no special actions otherwise. The feeling still exists that foreign influence may soon assert itself in the matter of prices. The London market quoted tin to-day at £197 5s. for spot and £188 for three months. So far this month 1750 tons have arrived, with 895 tons reported afloat.

Tin Plates.—The trade in tin plates is mostly of a routine character such as the season justifies. The big canners are not yet fully in the market for their 1912 demands. The price of tin plates laid down in Swansea, Wales, is reported as 13s. 6d. The price in New York for 100-lb. coke plates remains at \$3.64.

Lead.—The American Smelting & Refining Company on November 16 advanced its quotations to 4.35c., New York, for shipment lead in 50-ton lots. The price at St. Louis is relatively firmer, lead being sold by independents there at 4.27½c. The production of lead for 1910 as figured by the United States Geological Survey was 470,380 tons of 2000 lb., compared with 448,112 tons in 1909.

Spelter.—Spelter, which is still scarce and held close, is now at 6.80c., although some business has been done at 6.75c. The price to-day is within 20 points of the highest price reached in a decade.

Antimony.—No change is reported in the antimony market. Hallett's is quoted at 7.65c. and Cookson's at 8c.

Chicago

NOVEMBER 20.—A much more liberal buying of copper the past week was accompanied by a small advance in price. The metal market in general witnessed more activity than for some time and the general trend of quotations was upward. We have revised our prices and quote at Chicago as follows: Casting copper, 12.62½c. to 12.75c.; Lake, 12.87½c. to 13c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 44.50c.; small lots, 47.50c.; lead, desilverized, 4.30c. to 4.35c.; for 50-ton lots; corrodng, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.65c.; Cookson's antimony, 8.75c., and other grades, 7.75c. to 8.25c., in small lots; sheet zinc is \$8.25, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 10.75c.; copper bottoms, 9.62½c.; copper clips, 10.50c.; red brass, 9.75c.; yellow brass, 7.50c.; lead pipe, 3.85c.; zinc, 4.50c.; pewter, No. 1, 26c.; tin foil, 32c.; block tin pipe, 36c.

St. Louis

NOVEMBER 20.—The firmness of last report continues with added force in the metal market. Lead joined the procession and is to-day quotable at 4.27½c. Spelter took another spurt and is firmly held at 6.60c. Tin advanced to 43.70c.; Lake copper to 13.10c.; electrolytic to 13.10c. Cookson's antimony remains firm at 8.35c. The demand the past week has been good and the opening for the current week holds up well. In the Joplin ore market the ore prices responded only in a measure to the sharp advance in the price of spelter. The inactivity of buyers, under present conditions, is discouraging the mine owners, who are talking more than ever of curtailment by means of a widespread shutdown. This will be settled at a meeting Wednesday night. The open market basis for choice blende was \$47 per ton, while high grade ore brought \$50. On contract the basis was \$47.90, with the top grades bringing \$52.50 figured on the basis of spelter, East St. Louis. The basis for second grade was \$48. Calamine continued to bring high prices, ranging from \$23 to \$28 assay basis for 40 per cent. metallic content. Choice lots brought as high as \$35. Lead ore, in good demand, brought from \$54 to \$57 per ton. On old metals we quote: Light brass, 4c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3.25c.; pewter, 30c.; tin foil, 29c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, November 22, 1911.

The stock market has again shown considerable strength. Various influences have contributed to this. The rumors now in circulation are directly opposed to those prevailing only a short time ago, when everything tended to depress values. Such rumors are now in circulation as that the suit of the United States Government against the United States Steel Corporation is likely to prove fruitless or may be withdrawn by the Department of Justice. This rumor is stated to have caused a sharp rise in Steel common on Friday, which carried other industrial stocks with it. That date proved to be the culminating point for the period under review, as prices thereafter receded somewhat. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	3¼	Pressed Steel, com..	33 - 34¼
Allis-Chalm., pref....	14 - 15	Pressed Steel, pref..	97 - 100
Beth. Steel, com.....	29 - 31	Railway Spring, com.	30¼ - 32¼
Beth. Steel, pref....	57¼ - 58¾	Pressed Steel, pref....	101
Can, com.....	11¼ - 11¾	Republic, com.....	20¼ - 23¼
Can, pref.....	89½ - 90¾	Republic, pref.....	79¼ - 81¾
Car & Fdry., com.....	51¾ - 56¼	Pipe, com.....	14
Car & Fdry., pref.....	116 - 116¾	Pipe, pref.....	43 - 44
Steel Foundries.....	32¼ - 34	U. S. Steel, com.....	60¾ - 65¾
Colorado Fuel.....	27 - 28	U. S. Steel, pref.....	108¼ - 110¼
General Electric.....	152¼ - 155¾	Westinghouse Elec.	64¾ - 67¾
Gr. N. Ore Cert.....	43 - 43¾	Am. Ship, com.....	48
Int. Harvester, com.	106 - 109	Chic. Pneu. Tool.....	45
Int. Harvester, pref.	120½	Cambria Steel.....	43½ - 43¾
Int. Pump, com.....	33 - 34¾	Lake Sup. Corp.....	27 - 27½
Int. Pump, pref.....	82	Pa. Steel, pref.....	103
Lackawanna Steel....	30 - 31	Warwick.....	10½
Locomotive, com.....	36 - 37¾	Crucible Steel, com..	11¼ - 11¾
Locomotive, pref.....	102¾	Crucible Steel, pref..	78½ - 80½

Dividends Declared

The General Electric Company, regular quarterly 2 per cent., payable January 15.

The Crucible Steel Company of America, regular quarterly, 1¼ per cent. on the preferred stock, payable December 22.

The National Lead Company, regular quarterly, ¾ of 1 per cent. on the common stock, payable December 30.

The blast furnace of the Worth Brothers Company, Coatesville, Pa., which has been in operation for about a year and a half, was expected by the builder to make 400 tons a day, but its average production for each day in the past month was about 450 tons, and the banner record was made early in November, when it produced 507 tons of pig iron of fine quality in 24 hours. Experienced iron and steel men who have examined this furnace and have noted the quality of the pig iron produced and the uniform regularity of its operation, pronounce it one of the best in the country. It has given the company practically no trouble since its installation. Work on the second furnace is progressing, and it will be completed by February 1, 1912. It will not be put into operation, however, until the steel plant becomes more busily engaged.

British Iron Trade More Active

Improvement has come in the past two weeks to the British iron trade. On Tuesday, November 21, Cleveland warrants closed at 47s 10½d as against 46s 6d in the first week of November, the advance being thus about 35 cents. Furnace companies are in a stronger position than for some time and their quotations for Cleveland No. 3 are 49s to 50s for prompt delivery. Stocks in Connal's warrant stores have been decreasing, though gradually. On November 10 the total was 574,000 tons, which represents a decrease of 27,500 tons from the high point of several weeks ago. In finished iron and steel products good buying continues and in some branches is very satisfactory. Manufacturers have a large tonnage on their books and the activity in shipbuilding is reflected in a strong market for plates and shapes. The scheme recently put into effect by which manufacturers of plates and shapes give a rebate of 5s a ton on the purchases of customers who do not buy from foreign producers met with some opposition in the beginning, but it is denied that its operation has checked business. Some of the members of the manufacturers' syndicate in the Midlands have made the rebate scheme apply to certain classes of car-building material.

The Bethlehem Steel Company a Seller of Pig Iron

It is definitely announced that the Bethlehem Steel Company, South Bethlehem, Pa., which has been a quiet seller of pig iron for some months, has decided to come openly into the market as a seeker for orders. It will be in a position to sell, based on its own present consumption requirements, some 200,000 tons of pig iron per year. The company has, however, refused thus far to sell for delivery beyond the next three or four months. The amount of iron it will actually sell will, of course, depend largely upon requirements in connection with its own steel works.

Industrial Week in Buffalo.—Under the auspices of the Industrial Bureau of the Chamber of Commerce and Manufacturers' Club, an exposition of "Buffalo Made Goods" is being held in Buffalo, N. Y., this week, ending Saturday, which differs somewhat from the usual exhibition hall method of display. The exhibits will be in the show windows of the principal stores bordering both sides of Main street, the most important business street of the city, from Exchange street to Edward street, a distance of about one mile. The exposition is held to illustrate to the citizens and visitors from surrounding towns the wide diversity of the manufactured products of Buffalo. This method of holding the industrial exposition was adopted because of its greater effectiveness, owing to the easy access afforded to the population of the city and the greater opportunity for grouping and displaying manifold attractions in a greater variety of manufactures than in an exposition hall. The portion of Main street covered by the industrial display section is a blaze of light each night, and for the time being is probably the most brilliantly illuminated thoroughfare in the world. A huge dome of colored electric lights is located at each end of the "Industrial Row." A number of special exhibition features are provided in some of the larger stores along the line of this industrial exhibit, including a machinery hall, a furniture hall, etc., and an exhibit from the Technical High School which will show what that institution of Buffalo is doing to qualify and send out young men capable of filling responsible positions requiring mechanical skill.

Another Great Foreign Trade Balance.—According to the Bureau of Statistics October imports and exports of merchandise show in each case an increase over those of the corresponding month of last year. The imports were \$131,378,176, against \$124,046,331 in October last year; exports, \$210,523,993, against \$207,709,086 in October a year ago. The excess of exports over imports was for October, \$79,045,817, and for the 10 months ended with October, \$401,660,066. The October exports were greater in value than those of any other October in the

history of the export trade. For the 10 months ended October, 1911, the imports decreased \$32,043,379, while the exports increased \$235,389,583.

The Dodge Mfg. Company, Mishawaka, Ind., made an interesting display in the exposition in Boston, Mass., held under the auspices of the Boston Chamber of Commerce. The products shown comprised iron-center wood-rim pulleys of various types, with attention called to the fact that they might be run at any speed without danger of explosion; solid and split clutches, showing the facilities with which the power in various departments of manufacturing plants may be cut off in case of accident without delaying to send word to the engine room to shut down the engine, thus perhaps saving a human life; collars, flange, keyless and Collins couplings in which all set screws and bolt heads are below the periphery of the fixtures. Many words of commendation were heard for the transmission house whose business ideals extend beyond mere sales to safety and the preservation of human life.

The Keystone furnace of the Reading Iron Company, Reading, Pa., which went out of blast August 1, resumed November 16. Under favorable conditions it produces about 1800 tons of pig iron weekly. Its product is mostly used by the company in the manufacture of wrought iron pipe. The Temple furnace of the same company is still idle, and it is not known when it will be started.

The Parkesburg Iron Company, Parkesburg, Pa., is running about two-thirds capacity, and is making better time than it has at any time since 1907. The company manufactures charcoal iron boiler tubes.

The present condition of coal mining in Indiana, miners and operators say, does not reflect much industrial activity. President W. D. Van Horn, of the Indiana Mine Workers, says the past month was the dullest October in his 35 years' experience. Philip Penna, secretary of the Indiana Operators' Association, says that such a dull condition is unheard of. In the block coal districts miners are working half-time, whereas the mines run double time usually in October. Winter weather will help the domestic demand, but it is the steam coal trade that is most demoralized.

Consul Alfred A. Winslow, Valparaiso, Chile, makes the following report to the Bureau of Manufactures: "The blast furnace at Corral, recently constructed by a French company at an expense of more than \$3,000,000 United States gold, is closed down. This has thrown several thousand men out of work. The new plant was built under a Chilean government guarantee of 5 per cent. interest above operating expenses. Some pig iron was manufactured, but it was found very expensive."

The British government is to undertake an inquiry into the cost of living of working classes. The prices of groceries have advanced 13 per cent. since 1898, and the price of meat rose 20 per cent. between 1905 and 1907. In the last 10 years also the price of clothing materials has risen 5 to 7½ per cent. Another necessity of life—coal—has advanced about four shillings per ton since 1898. On the other side of the balance sheet, wages have gone up but not sufficiently to compensate for the increased cost of living.

The Commonwealth Steel Company, Granite City, Ill., has just completed and will dedicate on Thanksgiving Day a \$25,000 building for the use of its employees and their children. It is equipped with educational facilities, and graduates of the school to be maintained there will be given preference in employment in the company's plant.

Alford & Fay are building a plant at Fairland Station, just outside the city limits of St. Louis, Mo., which will make a product by a direct process from iron ore from southeastern Missouri mines. It is stated that the initial unit of the plant will have a producing capacity of 100 tons per day.

The foreign trade of the Latin-American republics with the world has increased in the last five years from \$1,700,000,000 to \$2,260,000,000, a gain of \$560,000,000.

Personal

Charles M. Schwab, president Bethlehem Steel Corporation, has returned from a foreign tour, in the course of which he spent some time in China. Interviewed by representatives of the daily press, he said that his mission to China was most satisfactory and that he hoped to be able to make a definite statement later regarding what he had accomplished there.

H. G. Stoddard, who recently resigned as president of the Trenton Iron Company, Trenton, N. J., to become identified with the Wyman & Gordon Company, Worcester, Mass., was the guest of honor at a dinner given by the leading business and professional men of Trenton, November 13. President Farrell of the United States Steel Corporation, ex-Governor Stokes of New Jersey, and Walter K. Bowne, of the Trenton Iron Company, were among the speakers.

Wm. P. Palmer, president of the American Steel & Wire Company, has been elected president of the Trenton Iron Company, a subsidiary interest, succeeding H. G. Stoddard, who recently resigned. C. L. Miller is vice-president and W. K. Bowne is secretary and treasurer. C. A. Vogt has been made auditor. T. H. Taylor succeeds Mr. Stoddard on the board of directors.

E. W. Edwards, president of the Edwards Mfg. Company, Cincinnati, Ohio, was elected last week by a large majority, as a member of the board of directors of the Cincinnati Business Men's Club.

J. M. Manley, secretary of the Cincinnati Branch, National Metal Trades Association, was selected last week to fill the newly created position of assistant-to-the-president of the Cincinnati Business Men's Club. He will continue supervision over the local office of the Metal Trades Association.

The Roberts & Abbott Company, Cleveland, Ohio, composed of E. P. Roberts and W. H. Abbott, has dissolved and E. P. Roberts, who is president of the Cleveland Engineering Society, will continue to occupy the offices in which the company was located at 1123 Schofield Building, as consulting engineer.

The Union Switch & Signal Company, Pittsburgh, announces that J. P. Coleman has resigned as chief engineer and has been appointed consulting engineer; L. F. Howard has been appointed engineering manager, with full authority and responsibility in the organization and administration of the engineering department of the company, and F. B. Corey, who was for some years with the General Electric Company, has entered the service of the Switch & Signal Company, taking up the reorganization of the inspection department as engineer in charge of inspection.

Kilburn D. Clark has resigned as representative in northern and western New York of the Harbison-Walker Refractories Company, Pittsburgh.

Jacques Abady, a director of Alexander Wright & Co., Ltd., Westminster, England, engineers and manufacturers of measurement and control apparatus, sailed for London via Quebec, November 17, after a two weeks' visit with their American branch, the Precision Instrument Company, Detroit, Mich. He is one of the co-inventors of the Simmance-Abady combustion recorder, Simmance-Abady vacuum and pressure gauges and other apparatus for testing various conditions of steam, gas, water and air. His visit was partly with the object of discussing several new inventions, which have passed the experimental stage, and which will shortly be on the market for general use in steam and gas plants. In addition to his business activities, Mr. Abady is a barrister, chairman of the Works Committee of the Council of Westminster, and is the author of "Abady's Gas Analyst's Manual," "Coal and Common Sense," "The ABC of Combustion," and other contributions to technical literature.

B. Hoersgen, president of the Krefeld Steel Company of New York, 30 Church street, will return from Europe November 23.

G. W. Kneisly, formerly with the Edgar Allen American Manganese Steel Company, is now connected with the district sales office of the Lackawanna Steel Company at Cleveland, Ohio.

The Braeburn Steel Company, Pittsburgh, has recently appointed, through President William Metcalf, Jr., J. F. Rees, formerly of its Chicago office, manager of the De-

troit, Mich., office with headquarters at 403 Union Trust Building, to succeed J. E. Love, recently resigned. Mr. Rees will cover the territory in the lower peninsula and through Toledo, Ohio.

J. E. Stark has resigned as superintendent of the Western Wire Goods Company, a position he had held for the past four years, and has been elected president and general manager of the Electric City Mfg. Company, 60 Cherry street, Buffalo, New York.

H. S. Matthews, formerly vice president and general manager of the Alabama Consolidated Coal & Iron Company, has succeeded Joseph H. Hoadley as president.

Sidney G. Koon, who has been engaged in metallurgical work for the Jones & Laughlin Steel Company, Pittsburgh, particularly in the open-hearth department, has resigned to join the staff of Walter B. Snow, publicity engineer, Boston, Mass.

E. W. Oglebay, of Oglebay, Norton & Co., Cleveland, dealers in ore, is being talked of as a candidate for the United States senatorship in West Virginia. While having large business interests in Cleveland, Mr. Oglebay has maintained his residence in Wheeling, W. Va.

J. M. Belleville, general freight agent of the Pittsburgh Plate Glass Company, Pittsburgh, was elected president of the National Industrial Traffic League at its meeting held in Chicago last week.

Edgar Brosius, Machesney Building, Pittsburgh, has been appointed representative in the Pittsburgh district of the Orton & Steinbrenner Company, Chicago.

The Stanley Committee Resumes

At the session of the Stanley Committee at Washington, November 20, a motion was made by counsel for the United States Steel Corporation to discontinue the investigation because of the Government's prosecution of the corporation. The committee went into executive session to discuss the motion, but no decision was arrived at. However, on Tuesday, November 21, witnesses were examined as to the cost of the Duluth, Missabe & Northern Railroad. Alfred Merritt, of Duluth, the first president of the road, told the story, already very familiar to the iron trade, of the loan of \$1,000,000 made by John D. Rockefeller in the early nineties, and of the subsequent foreclosure of the mortgage he had taken on the railroad. The purpose of the examination, it was pointed out, was to show that the earnings of the railroad were large in comparison with its first cost. No reference was made in the examination of Alfred Merritt to the suit he brought against John D. Rockefeller some years after the road was taken over and of the settlement of that suit out of court, on terms which were at that time supposed to be satisfactory to the witness. Mr. Merritt spoke of the passing to Rockefeller interests of the ore properties he and his brother had discovered and told how valuable these properties are to-day. The Stanley Committee will also be able to find witnesses who parted with real estate in New York City and other cities years ago and would now have to pay many times what they received for it if they were to buy it back.

The annual banquet of the Cincinnati Branch, National Metal Trades Association, will be held at the Business Men's Club on the evening of December 7. Among the speakers who have accepted Secretary Manley's invitation to address the gathering are: M. C. Robbins, manager *The Iron Age*, New York; Charles E. Carpenter, vice-president E. F. Houghton & Co., Philadelphia; John A. Hill, president Hill Publishing Company, New York, and W. E. Downing, freight traffic manager Illinois Central Railroad, Chicago.

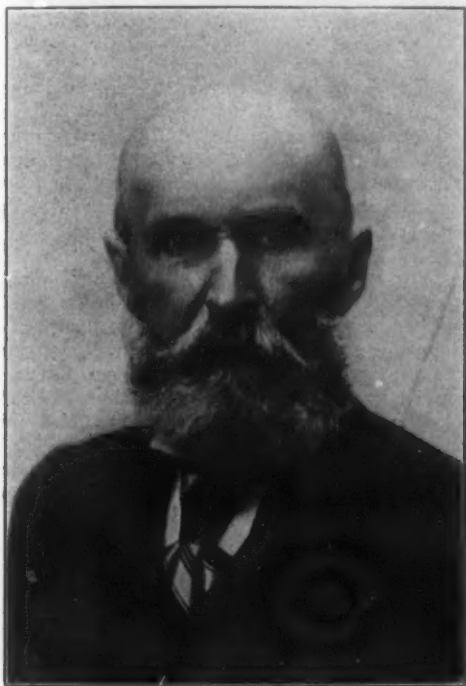
The startling statement was recently made by Premier Kokovsoff of Russia, in reply to questions raised in the Duma, that, owing to the complete failure of the crops in twelve provinces and partial failure in eight others, no fewer than 8,000,000 inhabitants of the 12,500,000 in the affected territory were in urgent need of immediate relief. The expenditure of \$60,000,000 would be necessary, one-half to be used at once to defray the cost of supplies already dispatched.

Obituary

Richmond Viall

Richmond Viall, Providence, R. I., superintendent of the Brown & Sharpe Mfg. Company from 1878, died November 16, aged 76 years. His death was caused by a paralytic shock, but he had been in poor health for two years. Born in Barrington, R. I., descended from one of the oldest New England families, he received his early schooling in East Providence, to which town his father had moved. At the age of 17 he became a jeweler's apprentice. After remaining in the employ of Briggs, Hough & Stone for four years, he went to Attleboro, Mass., in 1857 and worked at his trade until the Civil War broke out, when for two years he was engaged in the manufacture of cavalry sabres.

On January 6, 1863, Mr. Viall entered the employ of J. R. Brown & Sharpe as a screw machine operator, working for the usual day's pay, but in a little less than a year he became foreman of the department with 37 men under him. In 1872, when the plant was moved to its present location, he assumed complete charge of the department devoted to the manufacture of the Willcox & Gibbs sewing machines. Six years later he was made superintendent,



RICHMOND VIALL

a position which he held until his death, although relieved from active work since 1902.

When Mr. Viall took the superintendency in 1878, while the stress of the financial panic was still being felt, he found that the total demand for the company's product, from all over the world, was being supplied by a force reduced to 200 men. Steadily from that time the works became prosperous, and on his retirement from active duties in 1902 more than 2000 men were on the payroll and the floor space had increased to 360,000 sq. ft.

Many factors have contributed to the growth of the Brown & Sharpe Mfg. Company. One was the inventive genius of Joseph R. Brown, coupled with his high standard of workmanship; another was the keen and far-sighted business policy consistently adhered to by Lucian Sharpe; a third was Mr. Viall's personality. Not only was he fitted to superintend the practical operations of a large shop, but his very democratic spirit, his keen insight into human nature, his loyalty, his fine sense of honesty, and his sympathy with the men under him, all united to give him his influence in the expansion of the business. He was not a great mechanic but he possessed executive ability and a nature which would not permit him to do an injustice. He studied men and learned their peculiarities. With a reputation of governing the shop by certain

well-defined rules, he still recognized that their strict interpretation did not apply to all cases. He was quick to remedy any falling in the standard of workmanship or any other condition operating against economy.

He realized the value of the co-operation of several individuals instead of the labor of one, and there was no more striking example of this than his willingness to work with his foremen and give each man credit for his work. He insisted upon honesty and dependableness among his foremen, and no man was chosen for this position unless he had these characteristics. No matter how much a man might differ from him in temperament, if he was truthful and competent he would be given preference for a foreman. It was Mr. Viall's opinion that the dissatisfaction and unsettled feelings which sometimes arise in the shop are caused in a great measure by unfair rivalry and by misunderstandings between the foremen and workmen. Accordingly he emphasized the law of mutual helpfulness, in the belief that it increased the value of both skilled and unskilled workmen and also tended to unify and harmonize shop life. His reputation for giving full directions as to the manner in which his instructions were to be carried out was such that there was never any doubt in the mind of the recipient of his orders as to the right course to follow.

No record of Mr. Viall's life would be complete without emphasis on his kind and sympathetic nature. He was ever thoughtful of the welfare of his men and often visited them, searching those who might need his help. He was married in 1859 to Eliza M. Cole by whom he had four children, one of them, William A. Viall, being now the secretary of the company.

GEORGE WHITING HEBARD, vice-president of the Westinghouse Electric & Mfg. Company, died November 17 at Bronxville, N. Y., aged 66 years. He was born at Barre Center, Orleans County, N. Y., received his education at the Albion Academy and came to New York City in 1869. Mr. Hebard was one of the pioneers in the electrical industry, having become identified with the manufacture of such apparatus in 1882. His business interests at the time of his death were extensive. He was vice-president and trustee of the Sawyer-Man Electric Company, and director in the Bridgeport Gun Implement Company, Bryant Electric Company, Consolidated Electric Light Company, Lackawanna & Wyoming Valley Railroad Company, M. Hartley Company, Perkins Electric Switch Company, Union Metallic Cartridge Company, and Greene Consolidated Copper Company. He was a member of the Chamber of Commerce, belonged to the Lawyers' Club of Manhattan and the Union League Club of Brooklyn and took an active interest in church work. He leaves a widow and two sons.

WILLIAM H. LOVE, who was elected president of the New York State Steel Company, Buffalo, N. Y., last spring, died at St. Mary's Hospital in that city November 17, after undergoing an operation for appendicitis. He was 48 years of age. Prior to his election to the presidency, he was attorney for the steel company. He was a man of rare executive ability and was instrumental in placing the affairs of the company upon a good financial basis at the time of its reorganization. Before entering the profession of law, Mr. Love was for a number of years Superintendent of Education for the city of Buffalo.

CHARLES B. GRUBB, a retired ironmaster, died at Lancaster, Pa., November 12, aged 67 years. He was a son and one of the heirs of Clement B. Grubbs, of Lancaster. He was a descendant of Peter Grubb, who was the first to develop the Cornwall ore mines about 1742.

C. F. MARWEDEL, a pioneer merchant of San Francisco, Cal., founder of the metal, tool and shop supply business now conducted by C. W. Marwedel, died November 6 in a sanatorium in Switzerland, aged 78 years.

Crane furnace B, of the Empire Steel & Iron Company, Catasauqua, Pa., was blown out November 16 for necessary repairs. It had been in operation about two years, and will be relined at once. The Oxford furnace, of the same company, will also be relined, so as to be in a position to be put in operation should the demand for pig iron show an improvement.

For Lower Rates on Iron Ore, Coke and Coal

The Case of Mahoning and Shenango Valley Iron and Steel Manufacturers Presented to the Railroads

The Mahoning and Shenango Valley iron and steel manufacturers who for some time have been organizing a movement for lower freight rates on iron ore, coke and coal, presented their case to officers of the railroads over which they ship, at a conference in New York on Tuesday, November 21. The committee of the manufacturers consisted of James A. Campbell, president Youngstown Sheet & Tube Company, chairman; T. J. Bray, president Republic Iron & Steel Company; Henry W. Heedy, secretary Andrews & Hitchcock Iron Company; W. P. Snyder, president Shenango Furnace Company; John Stambaugh, Brier Hill Iron & Coal Company. The Republic Iron & Steel Company was also represented by its chairman, John A. Topping, who was a participant in the discussion. The railroad representatives at the conference were the first vice-presidents of the following roads: Lake Shore & Michigan Southern, Erie, Baltimore & Ohio, Pennsylvania, Pittsburgh & Lake Erie, and Pittsburgh, Bessemer & Lake Erie.

Freight Rates Compared

As has previously been indicated in these columns the average freight rate on materials assembled at Mahoning and Shenango Valley points for the manufacture of pig iron is about 9 mills per ton per mile. The data gathered by the manufacturers show that on coke shipped to the west from the Pocahontas fields as low a rate as 4.5 mills per ton per mile has been made. To the Buffalo district the coke rate is 5.6 mills per ton per mile. The present rate on coke from the Connellsville field to the Mahoning Valley is \$1.25 per ton for a haul of 135 miles. From Lake Erie the rate on iron ore to Youngstown is 56 cents a ton. The argument of the manufacturers is summarized in the following statement which was read at the conference of Tuesday by James A. Campbell, chairman of the committee:

The Manufacturers' Argument

YOUNGSTOWN, OHIO, November 16, 1911.

Mr. Joseph Wood,

First Vice-President, Pennsylvania Lines, and Chairman Executive Committee, Ore, Coal and Coke Lines, Pittsburgh, Pa.

Dear Sir: This committee represents furnaces and mill operators as specified herein, in the Mahoning and Shenango Valleys, and in their behalf we respectfully present for your consideration:

1. That the interests represented purchase transportation, when operated to capacity, for approximately:

Coke	3,200,000	tons	annually
Coal	1,700,000	"	"
Ore	5,800,000	"	"
Total	10,700,000	tons	

2. That the iron and steel interests in the Mahoning and Shenango Valleys, operating to capacity, as a whole purchase transportation for approximately:

Coke	5,348,000	tons	annually
Coal	6,116,000	"	"
Ore	10,654,000	"	"
Total	22,118,000	tons	

3. That our investigation indicates this volume is such that these commodities (coke, coal and ore) move in train-loads, averaging 3000 tons, with average earnings per train mile on coke of \$30, coal \$21 and ore \$24.20, from the respective points of origin to points of consumption in the Mahoning and Shenango Valleys. Railroad data would undoubtedly show average trains of about 4000 tons net, with earnings per train mile correspondingly increased.

4. That the earnings for these tonnages per train mile exceed the average earnings in trunk line and C. F. A. territory on all classes of tonnage handled (ore, coal and coke included) in the ratio of 11 to 1 on coke, 8 to 1 on coal and about 9 to 1 on ore.

5. That from the facts, as stated in the preceding

paragraph, it is apparent that for the cost of service rendered these commodities are bearing more than their fair proportion of transportation charges.

6. That the continued application of excessive earnings on coke, coal and ore is retarding the proper growth of the iron and steel industry in these districts, has restricted the market for their products and is causing intermittent operation or enforced idleness of mills and furnaces.

7. That since 1898 the physical improvements in tracks, grades, curvatures, bridges, motive power and car capacity have been such that the earnings per train mile on these commodities have greatly increased.

8. That notwithstanding the improvements in operating conditions, under which rates should have decreased, the rate on coke from the Connellsville district to the Mahoning and Shenango Valleys has been successively advanced. The same is true of rates on coal and ore.

9. That we believe it is to the best interest of the railroads serving these valleys that rates on these commodities be very materially reduced.

10. That the interests represented will no longer consent to bear the burden of rates which they believe to be unjust, unreasonable, excessive and discriminatory, and this committee, therefore, respectfully requests that rates on coke, coal and ore to the Mahoning and Shenango Valleys be placed upon a basis in proper relation to the cost of service rendered.

Yours very truly,

(Signed by the Committee.)

Interests represented by committee: Sharon Steel Hoop Company, Valley Mold & Iron Company, Sharpville Furnace Company, DeForest Sheet & Tin Plate Company, Stewart Iron Company, Youngstown Sheet & Tube Company, Girard Iron Company, Brier Hill Iron & Coal Company, Youngstown Steel Company, Struthers Furnace Company, Ohio Iron & Steel Company, Andrews & Hitchcock Iron Company, Empire Iron & Steel Company, Thomas Steel Company, Shenango Furnace Company, Republic Iron & Steel Company.

The Iron Industry Bears More than Its Share

In the general discussion of the issues involved in their request for lower rates, the manufacturers showed that at an average rate of 5.6 mills per ton per mile on all classes of freight hauled by the represented railroads the raw materials of the iron and steel works of the two valleys are bearing much more than their fair share. In other words, they contend that the low rates which the shippers of high-class freight have enjoyed have been made at the expense of the iron and steel manufacturers. It was urged that the Mahoning Valley manufacturer, confronted as he now is with idleness of plant and impairment of capital, is forced to ask the railroads to give him a freight rate more consistent with the cost of carriage and to abandon the old basis of "what the traffic will bear." It was further contended that the Pittsburgh and Valley districts are in danger from the growth of competition at Chicago, Buffalo, Birmingham and tidewater points. On behalf of the Mahoning Valley interests the following points were specifically presented:

"1. That iron and steel products are selling on the basis of substantially the rates which ruled in 1896; that the spread between cost and market rates is less than ever before in the history of the business.

"2. That the growth of traffic since 1896 in the Central District territory, as was established by the Interstate Commerce Commission, shows an increase of 100 per cent., and that while labor and taxes have increased, iron and steel products and most other items entering into maintenance are relatively cheaper; that with the great increase in density of traffic the cost of conducting transportation has greatly decreased. But notwithstanding these facts, the rates on mineral products or blast furnace supplies since 1896 have shown a very radical increase.

"3. The rates enjoyed by the railroads during the interim in question were so remunerative that evidence before the commission shows that the Pennsylvania Company has added to its capital improvements from profits, approximately \$262,000,000; that the Pittsburgh & Lake Erie Railroad has substantially added three tracks to its original one-track system; that the Lake Shore has purchased control of most of its subsidiary companies out of profits.

"4. The manufacturers of our district believe they are now justified in asking the railroads to give them some of the benefits which have accrued to the railroads in the way of lower costs of doing business as a result of capital improvements made from profits in iron and coal traffic, and that rates hereafter charged be maintained on as low a train-mile basis as that enjoyed by any other iron-making section. If the railroads are satisfied with the present rates on coal and coke to Chicago and Buffalo, then, under the more favorable conditions which maintain in the Mahoning Valley, relatively much lower rates could and should be made to our iron-making section."

Commissioner Lane's View

Commissioner Lane, of the Interstate Commerce Commission, in a recent decision against a freight advance, made the following comment on the practice of basing freight rates on "what the traffic will bear." It was quoted in the manufacturers' argument:

"Manifestly, under this principle all that stands between the shipper and extortion is the wisdom and the good sense of the traffic manager who makes the rates. If, in his judgment, it is advisable to carry a small volume of traffic upon a high rate, rather than a large volume of traffic upon a low rate, there is nothing to interfere with this decision and all the consequences affecting the country at large, excepting now the right of appeal to the government as represented in this commission. Rates being made upon this theory, the function of the traffic manager is that of a statesman; he determines zones of production and consumption, the profits of the producer and the cost to the consumer; he makes his rates, if he so pleases, to offset and nullify the effect of import duties and determines the extent and character of our foreign markets.

"To make rates for transportation based solely upon the ability of the shipper to pay those rates is to make the charge for transportation depend upon the cost of production rather than upon the cost of carriage—to measure a public service by the economies practiced by the private shipper. This necessarily gives to the carrier the right to measure the amount of profit which the shipper may make and fix its rate upon the traffic manager's judgment as to what profit he will be permitted. This theory entitles the railroad to enter the books of every enterprise which it serves and raise or lower rates without respect to its own earnings, but solely with respect to the earnings of those whose traffic it carries. This is not regulation of railroads by the nation, but regulation of the industries and commerce of the country by its railroads."

A formal reply from the railroads is expected in the near future. Until that is received no action will be taken by the manufacturers looking to the bringing of their case before the Interstate Commerce Commission.

Labor Notes

The wages of telegraph operators, towermen and agents on the New York Central Lines have been advanced from 10 to 15 per cent., dating from November 15. Employees to the number of 6000 will be benefited.

The Southern Railway has advanced the wages of several hundred of its clerical employees, the increase ranging from 5 to 15 per cent., in accordance with time of service. The Southern Railway also has arranged to raise the wage scale of its telegraphers, the average increase being about 15 per cent.

The Brotherhood of Boiler Makers has called on strike its members from the plants of the American Locomotive Company in sympathy with its members on strike from the shops of the New York Central Lines. Reports show that the boiler makers are drifting back to work in some of the plants and in others the company is replacing them with new workmen.

The commission appointed by the Massachusetts Legislature to consider the advisability of establishing a mini-

mum wage for women and minors held a public hearing at Boston last week. Employers of labor opposed the proposal on the grounds that it is unconstitutional and injurious to employers and employees alike; that it would give to the inferior employee the bonus which now goes to the superior one, and that it would increase the cost of living.

The Inland Steel Company, Chicago, has brought out a new edition of its handbook of "Open-Hearth Steel Products." This book is of value, not only for the illustrated sections and accompanying specifications of shapes rolled by this company such as have appeared in previous publications, but particularly in connection with the added lines. The most recent of the company's new products are boiler, structural and ship rivets and track spikes and bolts. The other products catalogued comprise blooms, billets and slabs, structural shapes, universal plates, sheets for all purposes and concrete reinforcing bars. Rerolled products from rail-carbon Bessemer steel are also presented in various forms. In addition to the usual tables of weights and dimensions, standard specifications and classifications of the several forms of steel are embodied in the contents.

Joseph E. Thropp, owner of the Earlston and Saxton furnaces, in Bedford County, Pa., has contracted with the Southwark Foundry & Machine Company, Philadelphia, for a 25,000-cu. ft. capacity Rateau turbine blast blower for his large Earlston furnace. It is expected to have it installed in four months.

Subterranean temperatures in relation to depth below ground have been noted in boring carried on for some 7300 ft. at Czuchow, in Silesia. At a depth of 1640 ft. the temperature was 79 deg. Fahr.; it reached 104 deg. at 3280 ft.; 156 deg. at 4920 ft., and 182 deg. at a depth of 7285 ft.

Iron instead of steel for underframes is specified in an order for 3000 railroad cars just placed by the Great Western Railroad, England. Iron is preferred by that railroad company as less susceptible to corrosion.

Punxsay furnace, of the Punxsutawney Iron Company, Punxsutawney, Pa., is to be blown in the first week of December. It has been out of blast for about ten months.

Trade Publications

Feed Water Heaters.—Rates Machine Company, Joliet, Ill. Catalogue. Size, 6 x 9 in.; pages, 24. Illustrates and describes the Cookson cast-iron heater and receiver with cut-out valves which is intended to serve as a purifier, oil separator and condensation receiver. One of the special features possessed by the heater is the ability to purify all the exhaust steam from the engine and auxiliaries. A new type of oil separator is used on this heater having cut-out valves that permit the heater body to be cleaned without interfering with the functions of the separator. *The Iron Age*, June 29, 1911, contained an illustrated description of this heater.

Filter.—James Beggs & Co., 36 Warren street, New York, N. Y. Catalogue No. P 37. Describes the Blackburn-Smith pressure filter which employs small and easily renewable cartridges for removing suspended matter from water or other liquids. Some of the applications of this filter are the clarification of a muddy water supply, removing oil and slime from boiler feed water or for clarifying the water used in processing systems.

Hydraulic Pumps.—The Watson-Stillman Company, 50 Church street, New York, N. Y. Catalogue No. 81, superseding catalogue No. 71. Size, 6 x 9 in.; pages, 120. Describes a number of standard and several new types of hydraulic pumps built by this company. In addition to the description of the pumps the catalogue contains considerable information of value to hydraulic engineers and users of hydraulic machinery. Beside the pumps themselves a number of accessories, such as valves, bonnets, valve stems, gauges, packing, etc., are also listed.

Triplex Plunger Pumps.—The Goulds Mfg. Company, Seneca Falls, N. Y. Bulletin No. 102. Relates to a line of single-acting triplex plunger pumps. The construction of these pumps is described at some length with half-tone engravings of the various parts supplementing the text. This is followed by specifications and illustrations of the two different classes of pumps which are designed for working pressures of 50 and 130 lb.

The Broken Lehigh Valley Rail

The Interstate Commerce Commission's Report

WASHINGTON, D. C., November 20, 1911.—The Interstate Commerce Commission today made public the report of Hiram W. Belnap, Chief Inspector of Safety Appliances of the commission, who investigated the accident caused by a broken rail at Manchester, N. Y., on the Lehigh Valley Railroad, on August 25 last. In order to secure complete information as to the composition of the broken rail and to determine if possible what caused it to fail, it was arranged through the Department of Commerce and Labor that its Bureau of Standards should make a complete examination of the several pieces which were delivered to it for this purpose. The result of the examination by James E. Howard, engineer physicist of the Bureau of Standards, is also made public.

Details Regarding the Train

The train to which the accident occurred left Buffalo 40 minutes late and consisted of 12 cars hauled by two engines. At Rochester Junction, 20 miles east, two additional cars were picked up, making 14 cars in all. On approaching the west end of the Manchester yard, the signals were found at caution, and being required by rule not to exceed a speed of 25 miles an hour through the yard the speed of the train was reduced accordingly. At the time of the accident the train was probably not exceeding that speed.

The report shows that the broken rail that derailed the train was 247 ft. west of a steel girder deck bridge spanning Canandaigua Outlet; that it resulted in the death of 27 passengers and one employee and injured 59 passengers and four employees. One of the injured passengers subsequently died. All the equipment of the train was carefully inspected and both of the engines hauling the train were thoroughly examined. The examination failed to disclose any defective condition of equipment that in any way contributed to the accident and all wheels and flanges were found to be in perfect condition.

Maximum Wheel Pressure on the Defective Rail

Trains are operated on the division where the accident occurred by the Hall automatic block system, and the signals governing the crossover switches in the east end of the Manchester yard are electrically connected with the block signal system so that if in any way the circuit between two blocks is broken the semaphore would indicate danger and could not be mechanically lowered to safety by the towerman. The fact that all the signals were set at clear by the towerman makes it evident to Chief Inspector Belnap that the rail that caused the accident was not broken at the time the train entered the block. This being true, it is regarded as probable by the chief inspector that as steam was just being admitted to the cylinders of both engines, in order to get the train under full headway, it withdrew much of the load from the pilot wheels, resulting in an excessive load on the driving wheels, thus applying a maximum wheel pressure to this defective rail, causing it to break under one of the engines. The cars immediately following the engines, although passing over this rail without being derailed, nevertheless caused additional fractures until its continuity being destroyed, the forward trucks of the sixth car dropped to the ties. This conclusion is established by the battered condition of the west ends of pieces of the rail found after the accident, as shown by photographs made by Mr. Howard.

The broken rail causing the accident was manufactured by the Bethlehem Steel Company, open-hearth process, 20 per cent. discard, 90 lb. to the yard, and was rolled December 24, 1909, heat No. 14,208. It was what is known as an A rail, which is the first rolled from the ingot. This rail was first laid in the main track of the Lehigh Valley Railroad, at which time it was a 30 ft. rail. Later it was shortened to 20 ft. and relaid. After the accident it was found that it had been broken in many places, the first being 31 in. in length, the next 27 in., the next 23 in., etc. Inspection showed that it was defective, being what is known as being a "piped rail." Analysis of the defective part shows that piping was due to slag originating in the steel furnace. In the examination of the rail, after

the accident, the piping or slag split could be seen in practically every part of it.

Transverse Fissures in the Head of the Rail

From the report of Mr. Howard, which the chief inspector freely quotes, it seems that in the head of this rail there were transverse fissures and that defects of this character cannot be detected except by chance. It further appears that they are of a more dangerous character than piping, since they are developed after the rail is laid. Mr. Howard's report points out that the development of these transverse fissures suggests that the limit of wheel pressures has been reached and probably surpassed, on rails of the usual width and shape of head, and that the increasing occurrence of accidents of this character is a warning of this fact. In this connection it is stated that the accident reports of the Interstate Commerce Commission show that in 1902 there were 78 derailments due to broken rails while in 1911 there were 249 derailments due to the same cause. In the last decade there have been 2059 derailments caused by broken rails, resulting in 106 killed and 4112 injured.

Copies of letters written by officials of the Lehigh Valley Railroad to their subordinates show that the company was cognizant of the fact that there were defective rails in service of the character of the rail herein described. In these letters the employees are cautioned to look sharply for defective rails "during the coming cold weather" when rails with slight defects are more likely to fail than in the warmer weather, and any rails that show indication of piping, cracks or other defects should be weeded out promptly.

Chief Inspector Belnap says these orders were issued prior to the time that the rail in question was reduced in length. Not only was the rail cut, but three one-inch holes were drilled through the web of the rail near the cut end, each of which, as well as the cut end of the rail, clearly showed after the accident evidences of the piping mentioned. "This rail," the report continues, "was cut and laid about four months prior to the accident and, on account of the unmistakable evidence of piping found after the accident, it would appear that this defect could and should have been discovered before relaying the rail."

Wheel Pressures Should Be Diminished

The chief inspector says in conclusion that with the information at present available it is extremely difficult to suggest any preventive of accidents of this character. From such information as he possesses, however, it seems apparent that the remedy lies in the diminishing of the wheel pressures and the lowering of direct compressive and bending stresses. Referring again to Mr. Howard's report, the chief inspector concludes that exhaustive experiments and tests should be begun and that a complete and searching examination should be made of the whole question.

This examination should deal with steel rails from the furnace to the time they are laid in the track; it should determine whether the tests now used in the steel mills are adequate to detect imperfect rails; it should ascertain whether the use of high carbon steel is not attended with dangers not recognized in the drawing up of current specifications; it should be extensive enough to inquire into the causes which contribute toward such a destruction of the structural integrity of the steel as was the case with this rail; it should take up the securing of measurements in the track of the actual fiber stresses which are caused by the new types and weights of locomotives, and under the different wheels of these locomotives, in order to obtain information from which to judge of the severity of the strains to which the track is daily subjected; in fact, track conditions as they exist at the present time should be dealt with even to the most minute detail.

Referring again to Mr. Howard's report, the chief inspector gives it as his opinion that the danger zone in the use of steel rails as are at present manufactured has been reached, and since it is supposed that transverse fissures are the direct result of high wheel pressures acting on a hard level a complete investigation should be made for the purpose of scientifically determining the matter and ascertaining a remedy. Until such an investigation has been made the danger of similar accidents will exist.

Steel Corporation and "Independent" Output

Decrease of Former and Increase of the Latter in Every Line but One in the Period 1902 to 1910

The American Iron and Steel Association has compiled, and has published in its Bulletin of November 15, the statistics of production of iron and steel by the United States Steel Corporation on the one hand and by the independent steel companies on the other. A comparison is made between 1902, the first full year of the Steel Corporation's existence, and 1910, the effect of the compilation being to refute the charge that the Steel Corporation is a monopoly. The Bulletin's statement is as follows:

Production in 1902 and 1910 by Steel Corporation and Independents

IRON ORE

The total shipments of iron ore from the Lake Superior region in 1902 amounted to 27,585,904 tons, of which the Corporation shipped 16,659,470 tons and the Independents 10,926,434 tons, the shipments of the Corporation exceeding those of the Independents by 5,733,036 tons, or 52.4 per cent. In 1910 the total shipments of Lake Superior iron ore amounted to 43,442,397 tons, of which the Corporation shipped 22,185,972 tons and the Independents 21,256,425 tons, the shipments of the Corporation exceeding those of the Independents by 929,547 tons, or only 4.3 per cent. The increase in shipments by the Corporation from 1902 to 1910 amounted to 5,526,502 tons, or over 33.1 per cent., while the increase in shipments by the Independents in the same period amounted to 10,329,991 tons, or 94.5 per cent.

The total production of iron ore in 1902 amounted to 35,554,135 tons, of which 16,063,179 tons were produced by the Corporation and 19,490,956 tons by the Independents, the production of the Independents exceeding that of the Corporation by 3,427,777 tons, or 21.3 per cent. In 1910 the total production of iron ore amounted to 56,889,734 tons, of which the Corporation produced 25,245,816 tons and the Independents 31,643,918 tons, the production of the Independents exceeding that of the Corporation by 6,398,102 tons, or 25.3 per cent. The increase in production by the Independents in 1910 over 1902 amounted to 12,152,962 tons, or 62.3 per cent., while the increase in production by the Corporation amounted in the same period to 9,182,637 tons, or 57.1 per cent.

COKE

The total production of coke in 1902 amounted to 25,401,730 tons, of which 9,521,567 tons were produced by the Corporation and 15,880,163 tons by the Independents, the production of the Independents exceeding that of the Corporation by 6,358,596 tons, or 66.7 per cent. In 1910 the total production of coke amounted to 41,708,810 tons, of which the Corporation produced 13,649,578 tons and the Independents 28,059,232 tons, the production of the Independents exceeding that of the Corporation by 14,409,654 tons, or 105.5 per cent. The increase in production by the Independents in 1910 over 1902 amounted to 12,179,069 tons, or 76.6 per cent., while the increase in production by the Corporation amounted in the same period to 4,128,011 tons, or 43.3 per cent.

PIG IRON

The total production of all kinds of pig iron, including ferro-alloys, in 1902 amounted to 17,821,307 tons, of which 7,975,530 tons were produced by the Corporation and 9,845,777 tons by the Independents, the production of the Independents exceeding that of the Corporation by 1,870,247 tons, or 23.4 per cent. In 1910 the total production of all kinds of pig iron, including ferro-alloys, amounted to 27,303,567 tons, of which the Corporation produced 11,831,398 tons and the Independents 15,472,169 tons, the production of the Independents exceeding that of the Corporation by 3,640,771 tons, or 30.7 per cent. The increase in production by the Independents in 1910 over 1902 amounted to 5,626,392 tons, or 57.1 per cent., while the increase in production by the Corporation in the same period amounted to 3,855,868 tons, or 48.3 per cent.

STEEL INGOTS AND CASTINGS

The total production of all kinds of steel ingots and castings in 1902 amounted to 14,947,250 tons, of which 9,750,386 tons were produced by the Corporation and 5,196,864 tons by the Independents, the production of the Corporation exceeding that of the Independents by 4,553,522 tons, or 87.6 per cent. In 1910 the total production of all kinds of steel ingots and castings amounted to 26,094,919 tons, of which the Corporation produced 14,179,369 tons and the Independents 11,915,550 tons, the production of the Corporation exceeding that of the Independents by 2,263,819 tons, or 18.9 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 4,428,983 tons, or 45.4 per cent., while the increase in production by the Independents in the same period amounted to 6,718,686 tons, or 129.2 per cent.

STEEL RAILS

The total production of Bessemer and open-hearth rails in 1902 amounted to 2,941,421 tons, of which 1,992,010 tons were produced by the Corporation and 949,411 tons by the Independents, the production of the Corporation exceeding that of the Independents by 1,042,599 tons, or 109.8 per cent. In 1910 the total production of Bessemer and open-hearth rails amounted to 3,635,801 tons, of which the Corporation produced 2,138,946 tons and the Independents 1,496,855 tons, the production of the Corporation exceeding that of the Independents by 642,091 tons, or 42.8 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 146,936 tons, or 7.3 per cent., while the increase in production by the Independents in the same period amounted to 547,444 tons, or 57.6 per cent.

STRUCTURAL SHAPES

The total production of structural shapes in 1902 amounted to 1,300,326 tons, of which 753,481 tons were produced by the Corporation and 546,845 tons by the Independents, the production of the Corporation exceeding that of the Independents by 206,636 tons, or 37.7 per cent. In 1910 the total production of structural shapes amounted to 2,266,890 tons, of which the Corporation produced 1,163,300 tons and the Independents 1,103,590 tons, the production of the Corporation exceeding that of the Independents by only 59,710 tons, or 5.4 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 409,819 tons, or 54.3 per cent., while the increase in production by the Independents in the same period amounted to 556,745 tons, or 101.8 per cent.

PLATES AND SHEETS

The total production of plates and sheets, including black plates (or sheets) for tinning, in 1902 amounted to 2,665,409 tons, of which 1,583,865 tons were produced by the Corporation and 1,081,544 tons by the Independents, the production of the Corporation exceeding that of the Independents by 502,321 tons, or 46.4 per cent. In 1910 the total production of plates and sheets, including black plates (or sheets) for tinning, amounted to 4,955,484 tons, of which the Corporation produced 2,380,106 tons and the Independents 2,575,378 tons, the production of the Independents exceeding that of the Corporation by 195,272 tons, or 8.2 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 796,241 tons, or 50.2 per cent., while the increase in production by the Independents in the same period amounted to 1,493,834 tons, or 138.1 per cent.

WIRE RODS

The total production of wire rods in 1902 amounted to 1,574,293 tons, of which 1,126,826 tons were produced by the Corporation and 447,467 tons by the Independents, the production of the Corporation exceeding that of the Independents by 679,359 tons, or 151.8 per cent. In 1910 the total production of wire rods amounted to 2,241,830 tons, of which the Corporation produced 1,508,294 tons and the Independents 733,536 tons, the production of the Corporation exceeding that of the Independents by 774,758 tons,

or 105.6 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 381,468 tons, or 33.8 per cent., while the increase in production by the Independents in the same period amounted to 286,069 tons, or 63.9 per cent.

CERTAIN FINISHED PRODUCTS

The total production of merchant bars, iron rails, skelp, nail plate, and other finished rolled products not enumerated above in 1902 amounted to 5,462,667 tons, of which 1,701,700 tons were produced by the Corporation and 3,760,967 tons by the Independents, the production of the Independents exceeding that of the Corporation by 2,059,267 tons, or 121 per cent. In 1910 the total production of merchant bars, iron rails, skelp, nail plate, etc., amounted to 8,521,274 tons, of which the Corporation produced 3,203,279 tons and the Independents 5,317,995 tons, the production of the Independents exceeding that of the Corporation by 2,114,716 tons, or 66 per cent. The increase in production by the Independents in 1910 over 1902 amounted to 1,557,028 tons, or 41.3 per cent., while the increase in production by the Corporation in the same period amounted to 1,501,579 tons, or 88.2 per cent.

ALL FINISHED PRODUCTS

The total production of all kinds of finished rolled iron and steel products in 1902 amounted to 13,944,116 tons, of which 7,157,882 tons were produced by the Corporation and 6,786,234 tons by the Independents, the production of the Corporation exceeding that of the Independents by 371,648 tons, or 5.4 per cent. In 1910 the total production of finished rolled products amounted to 21,621,279 tons, of which the Corporation produced 10,393,925 tons and the Independents 11,227,354 tons, the production of the Independents exceeding that of the Corporation by 833,429 tons, or 8 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 3,236,043 tons, or 45.2 per cent., while the increase in production by the Independents in the same period amounted to 4,441,120 tons, or 65.4 per cent.

WIRE NAILS

The total production of wire nails in 1902 amounted to 10,982,246 kegs of 100 pounds, of which 7,122,354 kegs were produced by the Corporation and 3,859,892 kegs by the Independents, the production of the Corporation exceeding that of the Independents by 3,262,462 kegs, or 84.5 per cent. In 1910 the total production of wire nails amounted to 12,704,902 kegs, of which the Corporation produced 7,041,692 kegs and the Independents 5,663,210 kegs, the production of the Corporation exceeding that of the Independents by 1,378,482 kegs, or 24.3 per cent. The decrease in production by the Corporation in 1910 as compared with 1902 amounted to 80,662 kegs, or 1.1 per cent., while the increase in production by the Independents in the same period amounted to 1,803,318 kegs, or 46.7 per cent.

TIN AND TERNE PLATES

The total production of tin plates and terne plates in 1902 amounted to 360,000 tons, of which 264,109 tons were produced by the Corporation and 95,891 tons by the Independents, the production of the Corporation exceeding that of the Independents by 168,218 tons, or 175.4 per cent. In 1910 the total production of tin plates and terne plates amounted to 722,770 tons, of which the Corporation produced 440,694 tons and the Independents 282,076 tons, the production of the Corporation exceeding that of the Independents by 158,618 tons, or 56.2 per cent. The increase in production by the Corporation in 1910 over 1902 amounted to 176,585 tons, or 66.8 per cent., while the increase in production by the Independents in the same period amounted to 186,185 tons, or 194.1 per cent.

A Table of Percentages

The Bulletin article in its summation says that notwithstanding the acquisition in 1907 of the property of the Tennessee Coal, Iron & Railroad Company, the United States Steel Corporation, instead of establishing and maintaining a monopoly in the manufacture of iron and steel, has not, in the ten years of its history, with one exception, increased its production of the articles mentioned in the table in the same proportion as the independent companies. In several lines the growth of the Independents was particularly marked. The Independents shipped from the Lake Superior region in 1910 almost twice as much iron ore as they shipped in 1902. In 1910 they made twice as many tons of steel ingots and castings and rolled twice

as many tons of structural shapes and plates and sheets as they rolled in 1902, while in 1910 their output of tin plates was virtually three times as much as it was in 1902. In the table below percentages are presented which summarize the statements given in detail above:

Production and shipments.	1902—Per cent.		1910—Per cent.	
	Corpora-	Indepen-	Corpora-	Indepen-
Iron ore—Lake Sup. shipments.....	60.4	39.6	51.1	48.9
Iron ore production.....	45.2	54.8	44.4	55.6
Coke production.....	37.5	62.5	32.7	67.3
Pig iron production.....	44.8	55.2	43.3	56.7
Crude steel production.....	65.2	34.8	54.3	45.7
Steel rails, production.....	67.7	32.3	58.8	41.2
Structural shapes, production.....	57.9	42.1	51.3	48.7
Plates and sheets, production.....	59.4	40.6	48.0	52.0
Wire rods, production.....	71.6	28.4	67.3	32.7
Miscellaneous rolled production.....	31.2	68.8	37.6	62.4
Finished rolled production.....	51.3	48.7	48.1	51.9
Wire nails, production.....	64.9	35.1	55.4	44.6
Tin and terne plates, production.....	73.4	26.6	61.0	39.0

In 1902 the production of the Tennessee Company is included with that of the Independent companies, but in 1910 its production is included with that of the Corporation. In 1902 it made 5.9 per cent. of the production of pig iron by the Independents and it made 3.19 per cent. of the production of steel ingots and castings.

Railroad Equipment Orders

The recent orders of the New York Central Lines are apportioned as follows: For the New York Central, 6350 freight cars; Lake Shore, 4000 box cars; Big Four, 1525 freight cars; Michigan Central, 2525 freight cars, and the Pittsburgh & Lake Erie, 3000 box cars, a total for all lines of 17,400. Of locomotives 120 have been purchased also by the New York Central Lines. The Baltimore & Ohio has placed its car orders as follows: For 2000 box cars and 2000 all-steel gondola cars with the Standard Steel Car Company, 2000 all-steel gondola cars with the Cambria Steel Company, 1500 composite gondola cars with the Pressed Steel Car Company and 500 box cars with the Mount Vernon Car Company. The Southern Railway has ordered 1200 gondola cars from the Pressed Steel Car Company, 500 gondola cars from the Mount Vernon Car Company and 500 box cars from the Lenoir Car Works. The Cambria & Indiana has placed an order for 300 hopper cars with the Cambria Steel Company. The Grand Trunk has ordered 1000 hopper cars and 1000 box cars from the Pressed Steel Car Company. The Harriman Lines are in the market for 65 all-steel combination baggage and postal cars. The Delaware, Lackawanna & Western is having 1000 miscellaneous freight cars reinforced with steel underframes by the American Car & Foundry Company. The Pennsylvania Railroad, which was reported in the market for 5000 cars, is now said to be preparing a new list which will bring the total up to 15,000. The Chicago, Milwaukee & St. Paul Railway, which ordered 500 steel underframes from the Bettendorf Axle Company, has increased the order to 1000. The Norfolk Southern has increased its inquiry from 500 to 1000 steel coal cars. The Illinois Central is in the market for 30 cabooses. The Chesapeake & Ohio is in the market for 24 locomotives, and the Norfolk & Western for 25 locomotives.

A notable development in the combustion of illuminating gas was brought to the attention of the gas industry in this country by Prof. William A. Bone, of Leeds, England, at the October meeting in St. Louis of the American Gas Institute. The details are not yet available, but it is understood that a discovery has been made by Professor Bone involving the maintenance of incandescence on the surface of a refractory material against which is directed a jet or jets of the gas mixed with perhaps six times the volume of air. The commercial interest lies in the fact that the arrangement secures local high temperature so that furnaces may be built of the refractory material and high efficiency of combustion and high temperature requirements may be met. The form of combustion has been applied to steam boilers.

The Brown Hoisting Machinery Company, Cleveland, Ohio, has received an order from the Dominion Steel Corporation, Sidney, Nova Scotia, for an electric trolley and bridge crane for handling ore on the docks. The handling plant will have a total length over all of 355 ft. The bridge will have a 225-ft. span and the trolley travel will be 316 ft.

Pittsburgh and Vicinity Industrial Notes

The Pennsylvania Salt Mfg. Company, Natrona, Pa., will make important improvements in its plant, including an addition to the power plant and laboratory, a new office building, and the replacing of old structures with fireproof buildings.

Hubbard & Co., Pittsburgh, manufacturers of shovels, spades, scoops and railroad tools, will erect a machine shop, 99 x 200 ft.

The Pittsburgh, McKeesport & Greensburg Railway Company, which is building a car barn at Irwin, Pa., will include a machine shop and repair pit.

The Verona Steel Castings Company, Pittsburgh, has applied for a charter and will engage in the manufacture of steel castings. The incorporators are J. M. Hansen, William Bierman and E. E. Jones, who are officers of the Standard Steel Car Company. About 18 months ago this company purchased a plant at Verona, Pa.

James L. Stuart, Pittsburgh, Pa., who has the general contract for the erection of an addition to the University of Pittsburgh buildings, has awarded sub-contracts as follows: Structural steel, John Eichleay, Jr., Company; roofing, Pittsburgh Clay Products Company; sheet metal work, Berritt Iron & Roofing Company, Wilkinsburgh, Pa., and ornamental iron work, Winslow Brothers, Pittsburgh.

The Union Spring & Mfg. Company, Pittsburgh, is building an addition to its foundry, 40 x 60 ft., to contain a 10-ton Shaw crane. This will increase its capacity about one-third. It makes Kensington all-steel journal boxes, small steel castings, springs, etc.

The Thomas Carlin's Sons Company, Oliver Building, Pittsburgh, has received an order from the Indiana Steel Company, Gary, Ind., for a Blake type crusher 15 x 9 in. and reports a fair trade in castings for mill and other uses.

The Carnegie Steel Company has ordered a large synchronous motor generator set and a switchboard from the General Electric Company for the Schoen Steel Works, McKees Rocks, Pa.

The Carlin Machinery & Supply Company, North Side, Pittsburgh, has issued a second list of new or rebuilt machinery which it has on hand. The list includes stationary and hoisting engines of various sizes, stationary and portable derricks and other new and rebuilt machinery.

At the monthly meeting of the board of directors of the Crucible Steel Company of America held in Pittsburgh November 15 the treasurer presented his report for the two months ending October 31, showing that earnings in that period were in excess of the requirements for the preferred dividend covering the quarter ending November 30, the operating profits for October alone being in excess of \$400,000, the largest showing since February, 1910.

The Harris Pump & Supply Company, Pittsburgh, has secured a contract for the installation of a 200-gal. per min. pump, to be operated by a 25-hp. gas engine for the Ohio Valley Water Company at Bellevue, Pa.

The Wheeling Metal & Mfg. Company, Glendale, W. Va., is making preparations for the addition of a department for the manufacture of skylights and metal cornice work. Frank Ransom of Charleroi, Pa., has been appointed manager of the new department.

The Forter-Miller Engineering Company, Hartje Building, Pittsburgh, is building seven standard-size gas producers for the Corning Glass Company, Corning, N. Y.

The National Roll & Foundry Company, Avonmore, Pa., is operating its works double turn. The company makes air blast chilled rolls, and reports having received some large orders for this product in the past month.

The Pittsburgh Gas Stove & Mfg. Company, Pittsburgh, has filed notice of an increase in its capital stock from \$5,000 to \$100,000. Edward J. Dashbach is secretary.

The Murphy Foundry Company, Beaver Falls, Pa., which secured a site about 200 ft. square on First avenue, near Sixteenth street, has erected a main building of steel, absolutely fireproof, about 100 x 150 ft., containing among other equipment, a 10-ton Byram cupola and a 10-ton crane. A smaller building houses the charging and grinding equipment, etc. The property has a siding on the Pittsburgh & Lake Erie Railroad, which affords connections with the Pennsylvania system. The company will manufacture high-grade gray iron castings, such as machinery parts and glass-house molds, besides carrying on a jobbing

business in castings up to two tons. Lawrence Murphy, formerly with Knott, Harker & Co., and the Keystone Driller Company's local concerns, is president, while William G. Murphy, formerly foreman of the foundry of the Best Mfg. Company, Pittsburgh, and later of that of the United States Sanitary Mfg. Company, Monaca, Pa., is secretary and treasurer. The company has close connections with another interest which enables it to secure promptly all the necessary patterns required in its business; also facilities for machining and finishing its castings.

The Glenmoor Mfg. Company has been organized at East Liverpool, Ohio, with a capital stock of \$25,000, and will erect a plant for the manufacture of a patented metallic packing for engines. The plant will include a foundry and machine shop, and bids are now being taken on the erection of the buildings.

The annual meeting of the Penn Motor Car Company was held at New Castle, Pa., last week, at which the following officers were re-elected: A. G. Breitweiser, president; J. S. Herbert, vice-president and chief engineer; J. J. Keeling, treasurer; C. E. Gregg, secretary and sales manager. The company is building a new factory, for which a large amount of machinery is being purchased.

The new 90-in. plate mill and the 14 and 16-in. continuous finishing mills being erected by the Republic Iron & Steel Company at Youngstown, Ohio, are nearly completed and will probably be put in operation in December. The plate mill will have a monthly capacity of 5000 tons and the other mills close to 10,000 tons.

The Miles Motor Tire Spring Company, capitalized at \$200,000, has been organized and will erect a plant at Braddock, Pa., near Pittsburgh. The incorporators are Charles W. Dressler, Thomas C. Aten, Charles L. Balyser and Zeneb A. Delwatts, all of Braddock; Frederick Miles of Wilkinsburg, Pa., and M. R. Myers, of Huntington, Pa.

The Berkshire Street Railway Company, Pittsfield, Mass., has placed an order with the Westinghouse Machine Company, East Pittsburgh, Pa., for two 750-kw. low-pressure steam turbines driving three-phase, 25-cycle, 375-volt, A-C. generators, to operate in conjunction with the old equipment, consisting of two 1200hp. Rice & Sargent reciprocating engines running at 96 r.p.m., directly connected to two 750-kw. alternators. The Kokomo Public Utility Company, Kokomo, Ind., has ordered from the Westinghouse Company one 1200-kw., one 60-hp. and one 35-hp. steam turbines as an addition to its present plant. The 1200-kw. turbine is one of the Westinghouse bleeder type, and an interesting point in connection with the installation is that an exhaust-steam heating system is to be used in connection with this turbine. These three turbines operate at a steam pressure of 160 lb., and under 28 in. of vacuum, obtained by means of a Westinghouse-Le Blanc condenser. The previous equipment consisted of two 1000-kw. Allis-Chalmers turbines, delivering two-phase, 60-cycle current, at 2300 volts, and the new equipment is intended to supplement this.

The Interstate Steel & Supply Company, 4046 Jenkins Arcade Building, Pittsburgh, dealer in iron, steel, coal, coke, sheets and general supplies, has recently secured warehouse facilities in the Duquesne Warehouses, Pittsburgh, which enable it to carry stocks of hoops, bands, nails, etc., to make prompt shipments. Max Rote, formerly with the Shaw Electric Crane Company, Cleveland, and the American Locomotive Company, is general sales agent of the company.

The Mesta Machine Company is erecting an addition to its office building at its works at West Homestead, Pa.

The city of Erie, Pa., will receive sealed proposals for a triple expansion crank and fly wheel pumping engine of 20,000,000 gal. capacity, in accordance with specifications of Chester & Fleming, hydraulic engineers, Pittsburgh, Pa.

The Laughlin-Barney Machinery Company, Union Bank Building, Pittsburgh, has been appointed agent in the Pittsburgh district for the Western Machine Tool Works, Holland, Mich., manufacturer of triple-gear radial drills in capacities of 3 to 7 ft. in four different patterns for each size, adapted to the use of high speed drills of maximum cutting speed. The company also represents the Luther & Gies Company, Milwaukee, Wis., manufacturer of the Milwaukee back-gear crank shaper.

National Founders' Association

Fifteenth Annual Meeting, New York, November 15 and 16

The liability of employers for industrial accidents and the conditions influencing business were absorbing topics of the annual convention of the executive heads of the foundries of the country held in the Hotel Astor, New York, last week. The word strike was practically not mentioned, and the fact was taken to emphasize the continuance of the individual close consideration of the problems of the employed. The constructive work, besides comprehending the education of the employee, both in respect to his work and the conditions which make for the success of his employer, includes the effort to direct impending legislation along rational lines to safeguard business against the ill-considered acts of the overzealous.

The National Founders' Association held its fifteenth annual meeting in New York at the Hotel Astor, November 15 and 16. The achievements of the meeting as regards the larger aspect of the association's influence related to the question of present business conditions and the question of the liability of employers for industrial accidents. The story of its general attitude toward present influences on business is the story of the meeting of the Administrative Council of the association held Tuesday afternoon, November 14, and more or less spontaneously made the subject of the alumni banquet participated in on Tuesday evening by the 40 past and present members of the council in attendance on the convention. The expression of the composite opinion of the alumni was brought to the attention of the association at its Thursday morning session, which had been arranged to take up the business question, and resulted in the adoption of a resolution calculated to reach all sorts of associations and commercial bodies with the idea of encouraging all interests to participate actively in the movement to stop insincere and ill-advised schemes for Federal interference with business.

The part which the meeting may be said to have taken on the question of compensation for accidents is a further unification of the idea that if further legislation along the line is to be consummated, as seems unquestioned, such matters as the limit of compensation and the necessity of having a law strictly constitutional must be looked after. Another feature of the meeting was the showing of the betterment which the wide existence of the open shop among association members has brought about in manufacturing methods and the mutual cooperation which exists and has been fostered by special attention to the human factor among the employees. These points were brought out in the address of President O. P. Briggs, in the reports of Secretary F. W. Hutchings and Commissioner A. E. McClintock, the latter of whom exhibited lantern views of the remarkable progress which has been made by the molding machine, both in handling difficult subjects and large castings, and views of equipment for the workman's comfort and in a paper by J. J. Wilson, superintendent of foundries, Cadillac Motor Car Company, Detroit, Mich., who brought out also what the molding machine had done in the making of difficult castings.

The Wednesday morning session was given over to the reports of officers and the appointment of convention committees. The president appointed the following committees on resolutions and on finance:

Resolution Committee: F. B. Farnsworth, McLagon Foundry Company, New Haven, Conn.; William S. Hallowell, Harrison Safety Boiler Works, Philadelphia; J. A. Milne, Allis-Chalmers-Bullock, Ltd., Montreal, Que.

Finance Committee: Irving H. Reynolds, William Tod Company, Youngstown, Ohio; E. L. Dawes, Standard Sanitary Mfg. Company, New Brighton, Pa.; Henry Woodland, Allis-Chalmers Company, Milwaukee, Wis.

President Briggs's address was in part as follows:

President Briggs's Address

The condition of the general foundry business, like that of most manufacturing lines in the United States, is not at so high a tide as we could wish for. Many of our plants on this side of the dividing line between Canada and the United States are running on short time and stock orders and have been doing so for several months, and in

general the condition of the foundry business is not so prosperous as we might desire, or as the present sound financial condition of the country would indicate that it should be. It is a great pleasure to report to you an entirely opposite condition prevailing among our more fortunate members on the other side of the Canadian line.

BUSINESS AND POLITICAL AGITATION

The question naturally arises with us as to why such a condition should prevail in the United States. We have fairly good crops in all lines, plenty of money for commercial purposes, no wars or disturbances,—at peace with everybody except ourselves. In the minds of most of our manufacturers, I find one reason above all others prevalent, namely,—too much political agitation. Undoubtedly, the welfare of the country demands that certain unlawful combinations be restrained, and brought into a condition of respecting the laws of our country governing such combinations. That reasonable steps to preclude such combinations are necessary and advisable, no one denies.

There seems to be, however, in the minds of our people, the impression that this most beneficent undertaking, once begun, has fallen largely into the hands of certain agitators, demagogues, and alarmists who have shouted their war cry abroad to an extent far beyond the intent of the law or the best interests of even the most injured by these alleged combination restrictions. There seems to be among those in official positions, members of Congress and state legislatures, such a preponderance of people who have not the knowledge of what a commercial age requires from the viewpoint of the employer, the employee and the consumer, as to render it extremely doubtful in the minds of the most innocent as to whether or not it is possible, at the present time, to conduct a business with any degree of safety whatever, where the energies and capital of more than one man are required.

Taking an example from our friends, the unions, this condition among certain people is best illustrated by a bright young Irishman, who, having recently become imbued with the idea of trades unionism, and when attending a union gathering had listened for an hour or so to the eloquent address of a typical Socialist, whose entire discourse was directed to the urgent necessity of destroying every industry that was a success, and demanding that the railroads be downed, the packers be downed, the steel corporations be downed, the food dealers' combinations of all kinds be downed, and having covered the entire scope of our natural products to a very complete extent, the young Irishman, feeling it was high time to act, arose and said, "I move, Mr. President, that this union at once proceed to down everything that is up."

While so considering this great question, will every one bear in mind that the greatest sacrifice and suffering resulting from a continued, prolonged depression of business, and consequent idleness of the wheels of industry, falls heaviest upon the working people.

STRENGTH OF THE UNION

During 1906, 1907 and 1908, the iron molders' union lost heavily in membership and exhausted its treasury. Subsequent events have proved the correctness of this assertion. I believe its membership was depleted at least 60 per cent. In 1907 its dues were increased very materially, in order to replenish an empty treasury. This recuperating program has gone on from that time until this.

During the last year and one-half or two years, they have been compelled to support a large number of strikes, almost entirely outside of this association. This drain upon the treasury has been very heavy, especially the money sent to the West, where strong efforts have been put forth during the last two years to establish an 8-hour workday, in conjunction with the machinists and other allied unions.

Notwithstanding this excessive drain, they have a little more than held their own, financially, during the past year.

now having actually on hand, in cash, considerably over \$400,000. They are sending organizers into all parts of the country,—into all territories,—and are exercising every effort within their power to bring the membership up to its former number.

That the iron molders' union has changed its attitude and methods to a considerable extent has been very apparent of late. From the time of the present management until recently, it made its boast of never calling off a strike. Technically, that was about correct. Lately, however, several strikes have been called off unconditionally, and such action was sanctioned by the national officers of the union. It is to be presumed that the real purpose of this was to discontinue strike benefits, and husband funds for the purpose of resurrecting the union.

THE SHORTER WORKDAY

In my report last year I called your attention to the effort being put forth by the unions at that time for a shorter workday, its main effort being centered on the Pacific coast. Subsequent to that time, a strike of considerable proportions was called by the machinists in New York City, for the purpose of accomplishing the same end.

The people on the coast, both north and south of San Francisco, maintained a most firm and persistent stand in opposition to the union efforts. As reported to you a year ago, the metal trade employers of the city of San Francisco were under contract with the unions, looking to the ultimate establishment of an 8-hour day. You will recall that one of the conditions of this contract with the unions was that unless they succeeded in establishing the 8-hour day both north and south of San Francisco, the contract could be canceled at the option of the manufacturers of that locality.

The unions having failed to establish the shorter workday in the territories named, the indications at this time are that San Francisco will now exercise its opportunity to extricate itself from this most ruinous, closed shop contract, and return to the same working hours and conditions as other employers of the Pacific coast. Indeed, it would seem imperative that such be the case, when you consider the fact that the industries of San Francisco have dropped off to such an alarming extent. This rapid decline in industrial activities of San Francisco has recently been stated by the Home Industrial League of that city as follows: "In 1904 San Francisco and environs had 4500 factories, with \$238,103,663 capital invested and 44,875 hands. In 1910, she has 1398 factories, with \$78,981,879 capital invested and 14,000 hands, a loss of more than two-thirds of her industrial strength."

Bear in mind that under the present open shop conditions, the working people involved, upon a careful analysis, are found to be enjoying better conditions, receiving larger annual wages, and enjoying many more of the luxuries of life than under any union rule ever administered at the hands of the iron molders' union or its contemporaries of the American federation of labor brand.

Another phase of unionism is more pronounced at this time than ever before, namely, the tendency of the American federation of labor union toward Socialism and socialistic principles. This has been quite marked recently by the change of presidents of the machinists' union, the former president being deposed, at the recent election, and his successor, it is understood, being a rank Socialist. He was elected over the former president by so great a majority as to indicate a larger following to the socialistic idea than ever before.

IMPROVED METHODS IN FOUNDRY PRACTICE

At the close of the year 1907,—the year following the great strike of 1906,—so much progress had been made in introducing modern appliances for the manufacture of castings that it was thought by many that the limit of the application of such improved methods had been reached; that our foundry practice which, in the light of subsequent events, had been sleeping or dormant for many, many years, in comparison with the progress made in other lines of manufacture, had attained a position of development fully equal to that of kindred lines of manufacture. The fallacy of this belief has been demonstrated during the past year in a most phenomenal manner. I believe that more new fields have been entered with the molding machine and similar devices, during the past year, than in any one year barring only that of 1906.

Prior to 1906, a large percentage of the employees of foundries of this association was unionized closely. Today, in my judgment, not to exceed 15 per cent. of them are unionized, and those shops still operating under union conditions are securing advantages which were never before possible.

Prior to 1906, when a manufacturer of heavy machinery castings found his shop struck, it was next to impossible to secure castings in neighboring foundries, nearly all manufacturers of this line of machinery castings being com-

pelled to operate under union regulations, their men refusing to work on patterns from struck shops. To-day the reverse is true, and has been true for the last four or five years, namely,—if any man in this association, a manufacturer of heavy castings, finds his shop struck, his entire output can be placed in open shop foundries of the association that have been opened up and placed under proper working conditions during the period cited.

In several cases during the past two years manufacturers of this class of castings, whose shops were struck, were compelled to secure their entire output from our open shop foundries, and did so readily at a price that surprised them, due to the fact that under the open shop conditions the proprietor, instead of the union, was operating the shop. The benefit to the foundry industry in this respect is incalculable. To me the surprising feature of this is that so few proprietors outside of your own membership appreciate what your association has accomplished. To a very great extent, the improved methods of making castings introduced during this period have helped to make this condition possible.

It is commendable on behalf of our membership that, in employing a new class of men for this work, they are disposed to treat them fairly, to pay them good wages, to provide good conditions and to see that they receive in all respects their share of the profits and benefits of the new methods. Our employees are our strongest allies. Not less than 75 and probably 85 per cent. of all our employees are good, honest citizens, anxious to do what is right.

THE REVIEW AND EDUCATIONAL WORK

The extension of the educational work is still very perplexing to your officers, all believing that a greater dissemination of the true situation and facts obtaining among working people of this country must be made. The association is truly entitled to great credit for what it has done by way of circulating such information, especially the information contained in our publication, *The Review*. Every month that rolls around brings us in more positive evidence of the efficacy of this magazine. I honestly believe the result of the educational feature of this review as it has been disseminated has been more beneficial in bringing around amicable relations and proper conditions, and a contented state of mind on the part of the employees who have read it, than any similar amount of money ever expended by this or any other association.

Whenever and wherever we have been able to present our case directly to these people, without the intervention of the so-called agitator, either of the labor union type or his sympathizers, we have been able to convince them of the correctness of our position. I do not think there is an exception to this rule.

EMPLOYERS' LIABILITY AND WORKINGMEN'S COMPENSATION

During the past year there has been considerable activity along the line of employers' liability and workingmen's compensation. In the constitutional respect, the atmosphere is somewhat cleared, certain errors being pointed out, by reason of which it is hoped that the efforts of the various commissions and committees having the matter in hand will result in a proper solution of the undertaking in due time.

Coincident with this work, the Federal Government, by way of its commission appointed for that purpose, is getting somewhat active, which action will be most interesting and helpful to all our members, when published. While in some respects we have been considered a little slow in taking action upon this most important question, I can but believe that we are making infinitely more progress in proceeding carefully than we would have made by plunging headlong into such a new movement without proper consideration and analysis of conditions prevailing in our own country. A standing committee has had this matter in hand for several years, and its report will be before you at the proper time, as slated on the program.

LABOR LEGISLATION

The question of labor legislation is perhaps more complex at this time than ever before, due to the mixed condition of political affairs in our Federal Government. Just what stand the two branches of Congress will take upon the labor demands during the coming session is problematical. Suffice it to say that if the employers and the better element of the working people are to have their cause properly cared for, greater precautions than ever will be necessary the coming winter. The unions are always on the job to a far greater extent than the employers.

PATENT LEGISLATION

A new phase of the labor situation as met at Washington is now presented by way of an attempt on behalf of certain members of Congress to modify or repeal the patent laws of this country. Bills to this effect were introduced at the last session of Congress. They will probably be reintroduced during the coming winter. It is pos-

sible that your consideration of patent legislation may be a little far-fetched at this time, when viewed from the standpoint of the functions of an organization of this kind. However, it appears to me that a repealing of our patent laws as they now stand would work as great disaster to the working people of this country as it would to the employers. All moves of this kind, in my judgment, tend to lower wages and, worse yet, to destroy ambition, a qualification which already is at too low an ebb in the minds of the working classes generally.

MEMBERSHIP AND FINANCES

The secretary's report on membership is the most gratifying report ever presented to a convention of this association, and I am pleased to report to you that the details of securing this increased membership have been in the hands and under the guidance of Secretary Hutchings, associated with Commissioner McClintock, and the rest of us, as occasions have presented themselves. To Hutchings and McClintock must be given the greatest credit for this magnificent showing. Especially is the secretary to be commended for the results obtained. I cannot say too much in commendation of him in this regard. Your finances are in splendid shape, as will be noticed by the treasurer's report.

Pursuant to the action of the last convention, the same offices have been maintained, notably, Detroit, New York, Chicago and Minneapolis. If the association desires that the same territory be covered and about the same programme of defense and education be continued in the future, as has been in the past, it would seem necessary to maintain them in the future. Commissioner McClintock has been stationed for the greater portion of the time at Chicago, Mr. Hutchings at Detroit, and Mr. Taylor has been in charge of the New York office, where all have given splendid satisfaction, as usual.

The Secretary's Report

The report of Secretary Hutchings included the following interesting points: The molders' union inaugurated and supported thus far in the calendar year 1911 strikes in 47 foundries, involving 1500 molders and core-makers. Six of these shops, employing 306 molders and core-makers, were of the association membership. In other words, there had been nearly seven times as many struck shops on the outside as on the inside. Since January, 1910, the molders' union has declared and supported strikes in 198 foundries, of which Mr. Hutchings had a record. Only 21 of these shops were in the membership. The strikes in 149 out of the 198 foundries have progressed to a point where there is no doubt that the union has been defeated, and in many of these it has recognized this defeat by discontinuing its support and instructing its strikers to find work elsewhere.

MEMBERSHIP

Since the last convention, he mentioned that the Administrative Council has acted favorably upon the applications of 61 foundry plants. The membership at the present time covers 491 foundry plants. For the past year the association continued the dissemination of literature to iron molders and machinists in conjunction with the National Metal Trades Association. This comprehended the mailing of The Review each month and an occasional circular of information to workmen. The favorable effect of the work was clearly shown by the letters received frequently from workmen. There can be no question, he said, that a broader distribution of the truth in regard to the present methods of trade unions, especially the one from which the members are defending themselves, would act as a material influence in lessening the liability to strikes.

The Commissioner's Report

The report of the commissioner was, as stated, illustrated by means of lantern photographs. The views covered a very large jolt-ramming machine in the works of the Mesta Machine Company; the successful machine molding of a piano plate, which is a light, thin casting of large area, with pins included in the casting on which are stretched the piano wires; some large work at the General Electric Company; large valves made in the foundry of the Ludlow Valve Mfg. Company, Troy, N. Y., including a 60-in. valve weighing 19,000 lb. and requiring a character of product capable of withstanding a water pressure of 300 lb. per square inch; work at the plant of William Sellers & Co., and the successful use of hinged match plates in the foundry of the McClary Mfg. Company, Lon-

don, Ont., where 30 tons of stove plates are produced per day. The commissioner's report was in part as follows:

The depressed condition of the foundry trade during the past year, has had much to do with limiting the number of molders' strikes. The molders' union has kept up an active campaign for new members, has endeavored wherever possible to gain recognition, for the purpose of compelling the individual workman to pay dues, and likewise their opposition to molding machines and handymen has been constantly before us. Their efforts to regain some of the ground they have lost during the past six years, are now taking the form of an active campaign to organize into separate local unions the negro molders in the South, and the foreign specialty molders in many foundry centers in the North. While the executive board of the union, at its spring meeting, gave sanction to strike a large number of shops in various parts of the country, the authority to act was left in the hands of the national officers, who have in the majority of cases deferred action pending more favorable trade conditions.

Of the fifteen struck shops reported to you one year ago, three of these are still receiving support and attention from your officers. We have also assisted in furnishing molders to three probationary members who are resisting the union.

In addition to the above, your officers were called in consultation with a number of members where trouble was pending, but in each case the difficulties were overcome without the necessity of active support on the part of the association.

During the past season, your representatives in the field have kept constantly in mind the importance of endeavoring in every way possible to impress on the membership the necessity of putting in effect such measures as would prevent strikes, and also enable a much stronger line of defence in case trouble actually occurs.

FREEDOM FROM UNION CONTROL

It is now seven years since this association in annual convention adopted its present policy and announced its willingness to give support to any of its members who wished to operate on the open shop plan, and free themselves from the tyranny of the molders' union. While at present 80 per cent. of the foundries enrolled in this association are non-union or open shops, at the time this declaration was made, 90 per cent. of the membership were operating strictly union shops, and the problems facing the members were serious to an extreme degree.

The influence of the union restrictions on freedom of employment and apprentices, and their opposition to molding machines and improved appliances had existed for so long a period that a majority of the foundry superintendents and foremen were inclined to the idea that it was not possible to operate a shop successfully without union molders, which condition was intensified where the product was large castings. During the past seven years, you have noted some radical changes and what was believed impossible in foundry practice a few years ago, we now witness as an every day accomplishment.

Instead of the average foundry foreman being skeptical about the success of the open shop, we find the reverse is now true. Superintendents and foremen seeking positions are particular to state that they believe in the open shop, and are familiar with molding machine practice. They realize that conditions have changed, and that foremen imbued with union ideas are no longer in demand.

DEVELOPMENT OF MOLDING MACHINES

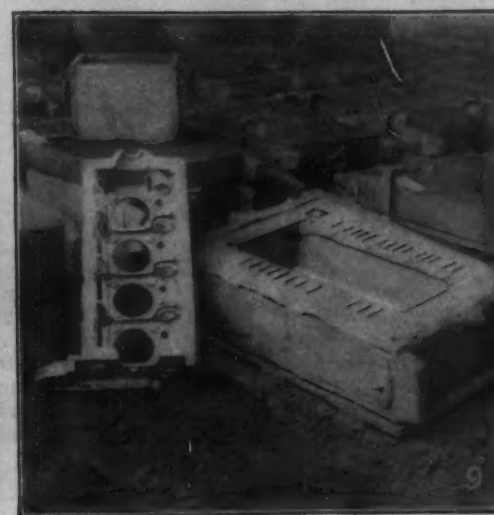
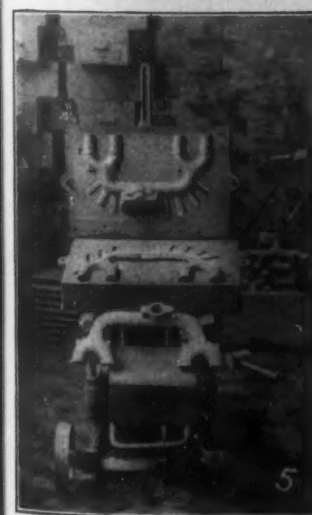
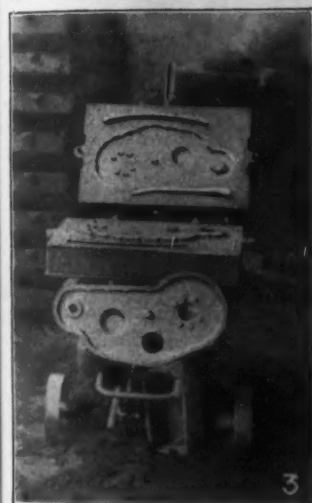
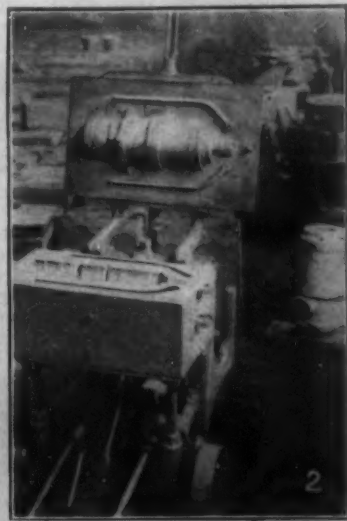
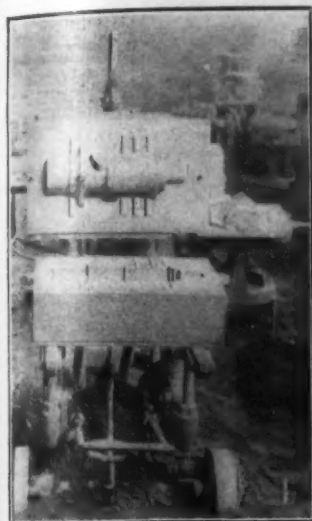
Two years ago, I exhibited photographs of miscellaneous machinery castings, weighing from 100 lb. to 12,000 lb., the molds for which had been made on jarring machines. Machines having a capacity of ramming copes and drags weighing 20,000 lb. were the largest then in use. At this writing, there are in successful operation machines capable of handling molds weighing 80,000 lb., and another machine is about to be installed to make molds weighing 120,000 lb. The problem of adapting the machine to this class of work, which hitherto was thought to be outside the range of mechanical methods, is being solved. While the tendency has been to build molding machines for heavier castings, fully as marked progress has been made in castings of lighter weight, which in the opinion of most foundrymen could not be made in this way.

I would refer particularly to piano plates as an illustration. In addition to reducing the molding cost over hand methods fully two-thirds, 135 pins for supporting the strings are cast in the plate. On hand molded plates, it has been necessary to drill holes in the castings, into which soft steel pins are driven. These machines are operated entirely by laborers, are paid piece work, and on the above described plate, five men put up and pour off 65 molds per day, while on the larger size, six men produce 55 plates.

MAINTENANCE OF OPEN SHOP

In the establishment and maintenance of the open shop foundry, the molding machine and handyman molder are the foundryman's greatest aid. The shop depending en-

tirely upon the non-union journeyman molder, and making no effort toward the use of molding machines or the education of a goodly percentage of apprentices and handy-men, is in a dangerous position to withstand the onslaught



EXAMPLES OF THE USE OF THE MOLDING MACHINE IN THE AUTOMOBILE CASTING FOUNDRY.

Views 1 and 2 show the drag half and the cope half respectively of a Cadillac cylinder, with the pattern just drawn from the mold. In explanation of the pictures, which, with the rest of the illustrations, were selected from lantern photographs exhibited by J. J. Wilson before the National Founders' Association, attention is called to the method of gating shown in No. 1 to distribute the iron to prevent segregation in the heavy sections. In No. 2 the leader is shown on both sides of the pattern and beside the machine may be seen the casting itself. Views 3 and 4 show the cope and drag molds of the engine end plate. The casting is shown in both views. No. 3 the cope side and No. 4 the drag side. The flask is 13 x 21 in. and the casting is very thin. The gates are distributed on both sides and corners on them are rounded off to avoid sharp corners of sand being broken off. No. 5 shows the drag half of the intake pipe connecting carburetor to engine combustion chambers, with core in place and finished casting below; No. 6 shows the cope half of the same mold. The special features are very thin section and a smoothness on the inside equal to that outside. The inside is cored. No. 7 shows the cope, drag and casting of the bottom half of the crank case or oil pan, a casting 3/16 in. thick. The drag is made on the rockover; the cope on a stand. There are six cores in the cope which must be set accurately, a gauge being used to locate all the cores in the right position. No. 8 shows the drag for the upper half of the crank case as it came from the machine with core beside the mold ready to be turned over and set into the mold. The core is about 26 in. long, 10 in. high and 10 in. wide, and laborers set the cores fully as well as the molders. No. 9 shows the cored side of the crank case casting and is regarded as difficult for the job molder. The multiplicity of gates is shown in both Nos. 8 and 9.

of the union. The success of the open shop depends on being able to pay the skilled non-union molder a higher wage than he can get by depending on the union, with its minimum wage scheme, which tends to hold the best men nearer a common level. It should be borne in mind that the non-union and open shop, with its operatives of varying degrees of skill, must of necessity require greater and more direct supervision. This is compensated for by lower tonnage costs, ability to maintain a full quota of foundry operatives during good times, and freedom from the restrictions of the union.

Another point to which I would call attention of the membership is the tendency toward dry sand as against green sand molding. In maintaining an open shop, and instructing handymen, the ramming of green sand molds is much more difficult of accomplishment than in the case of dry sand. For this reason, molds formerly made in green sand and requiring a high degree of skill, are now rammed by laborers and handymen, and the effect of too hard ramming overcome by drying the molds. Loam molding which long held the position of being the most difficult branch of the trade, is now successfully handled by handymen under the direction of an assistant foreman or an instructor or two, who lay out the jobs and superintend the various operations of the work.

I am also pleased to report that there is a constantly growing effort to overcome what was formerly considered the secrets and mysteries of the art of molding. The foundry chemist has exploded the mystery of cupola practice; the mixtures of core sand are no longer known only to some employee, and the knowledge of the whereabouts of patterns and core-boxes carried in the head of some pattern carrier. I can recall many instances where serious loss and much confusion was caused because the firm had no system of marking and cataloging its patterns and core-boxes, and where the foreman and man in charge of patterns suddenly decide to cast their lot with those on strike.

At this point, I wish to say just a word regarding the molders and coremakers now employed for struck shops. The loyalty and high character of these men is at a higher ebb than ever before, due to two facts:—first, we have always done exactly as we agreed with them in every particular; second—during some of those hard times, we have been compelled to carry these contract men at considerable expense, not being able to place them readily, notwithstanding which there has never been a contract made between any of these men and the association, during the present administration, that has not been lived up to the last penny, so that the good results of this protection to these men is more and more apparent every day.

OPEN SHOP VERSUS SHOP CONDITIONS

It is particularly gratifying to report that in my travels about the country, I find much is being done by the members of this association to provide their foundries with better light, heat, ventilation and wash room facilities. This condition does not apply to any one section of the country. One reason why so much money is being invested in foundry wash rooms, baths, lockers, etc., is because it pays. If we want a man to do neat work, we look for a man who is neat of person. If we expect to get a good day's work from a man, we must help him to keep himself in good condition physically.

The open shop is opening the door of opportunity to a class of workmen the union says should forever remain common laborers, and it is also using some very practical means to help him maintain or improve his physical condition.

In the matter of accident prevention, there is a marked improvement in the guarding of tools, warning employees as to danger points, etc. It is not now uncommon to enter a foundry and see various signs displayed cautioning the workmen of dangers attendant the careless handling of molten metal, the importance of wearing suitable shoes, etc. These signs act as constant reminders and supplant the instructions of the foremen. Over the gateway to a foundry, I recently noticed a large sign bearing an inscription to the effect that "if you wish to avoid accident and expect a fellow-workman to do nothing that may cause you injury, you must do nothing that will injure him."

Molding Machines for Automobile Castings

The Wednesday afternoon session was introduced with the presentation of a paper by J. J. Wilson of the Cadillac Motor Car Company, describing by means of the stereopticon the use of molding machines for automobile castings. There are but four distinct types of molding machines, he explained—the squeezer, stripping plate, rock over and jarring. Others are combinations. The impression seems to prevail, he continued, that any machine intended for the foundry does not require to be as well built as the machine for the machine or pattern shop.

Machines in the foundry are subjected to hard usage and they are constantly exposed to rust and sand or grit to a much greater degree than is the case in any other department. Sufficient attention has not been paid to the protection of all the wearing parts from sand. The following notes give important points in Mr. Wilson's paper and the accompanying illustrations will be of considerable interest in this connection:

If you are going to adopt machines in your foundry start right, make the selection with care and have the best pattern equipment obtainable: Iron flasks, well-made taper wood or metal snap flasks, which parts are interchangeable. All pin holes should be drilled accurately with a jig which has been fitted with hardened steel bushings. When the pattern is placed on the machine, after the type of machine most adaptable has been thought out, the kind of pattern material and how it should be made, method of gating, kind of flasks, etc., then we have the complete equipment for making good work, except a man to make the castings. The superintendent, foreman or instructor must furnish the experience for the operator until he becomes proficient.

What are the results to be obtained from the judicious use of the molding machine? 1.—A greater output per man and per pattern. 2.—Castings more uniform and true to pattern, which is essential in automobile castings or any other work where jigs and special tools are used for all the machine operations. 3.—The product at a reduced cost. 4.—Most important for our own peace of mind and benefit of the man who is willing and does do an honest day's work, a fair day's wage and the open shop.

An important matter in the core room is the inspection of cores. It is only by the daily, thorough inspection of cores that we can hope to detect cores made from boxes which have become worn and shifted, or cores improperly made or vented. If the cores are not properly inspected it frequently happens that a large number of cores are made in boxes from which a piece may have been lost or the boxes badly worn, sand not properly rammed or corners or edges knocked or worn off.

Frequently we see a casting which will be run with one or two gates, where a dozen to fifteen might be used to better advantage. Iron should be so distributed that the danger from segregation in the heavy sections and unequal strain caused by the hot iron not being well distributed in the mold when pouring is reduced to a minimum.

One of the things which is looked upon as being of considerable importance in many of the foundries is the high melting ratio of coke to iron. Our policy has been to make very small charges, evenly distributed, every bit of material weighed, both iron and coke. No special effort is made to save fuel at the expense of an inferior product. The only thing considered is the quality of iron which comes from the cupola. This is necessary, regardless of whether we melt one to five or one to nine.

The general freedom with which what might be called inside information of the various works had been contributed through both Commissioner McClintock and Mr. Wilson, led C. H. Gifford, American Blower Company, to remark that the existence of secrets is becoming less and less the case in foundry practice, and he proposed a vote of appreciation, which vote was carried, for the addition to general knowledge contributed through the broad-gauge attitude of William Sellers & Co., W. W. Kimball & Co., McClary Mfg. Company, Ludlow Valve Mfg. Company, General Electric Company, Mesta Machine Company and Cadillac Motor Car Company in affording the opportunity to exhibit the pictures.

Liability of Employers for Industrial Accidents

The programme of the meeting had arranged for special consideration of the question of liability of employers for industrial accidents and papers were presented by the representatives of two insurance companies and by the attorney of the association.

The first speaker was W. G. Cowles of the liability department of the Traveler's Insurance Company. He mentioned the constitutional obstacle which must be met in a compensation law which is to stand. He laid special emphasis on the claim that compensation does not proceed as a matter of right, but must have an element of mutuality. He admitted that there should be compensation, particularly in the hazardous occupations, but maintained that

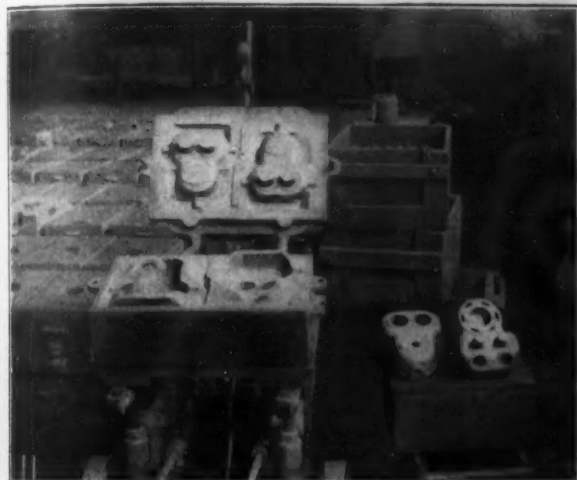
the employee should, to express it briefly, contribute toward the maintenance of compensation funds, and in that way provide the condition of mutuality regarded as so important. The speaker dwelt at length on the experiences of the German state insurance, contributing statistics to show that it had not, in his opinion, worked very satisfactorily. There is no collection of reserve in that case and he felt that it was worth while to consider what is to occur in Germany in the event of a paralysis in trade. He also mentioned the operation of the law in the State of Washington, where as the result of accidents in powder companies there is a total claim against the State of \$32,000 and about \$270 to meet the claim. He emphasized that there should be no competition in rates among the

a better service could be given by the insurance companies.

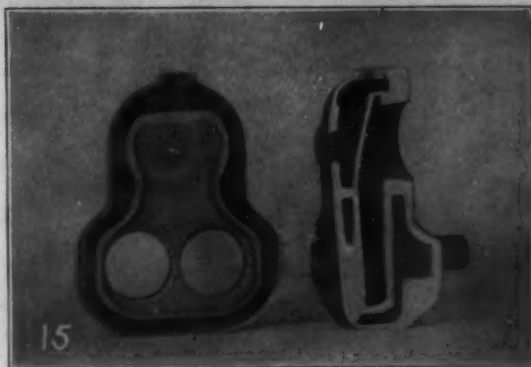
Edwin W. DeLeon of the Casualty Company of America also contributed a paper, and both he and Mr. Cowles referred to various analyses which had been made particularly of the German experiences, but Mr. DeLeon also advanced arguments against state insurance on the basis of the experiences in England and in Continental countries in addition to Germany.

J. H. Schwacke of William Sellers & Co., Philadelphia, of the association's committee on the subject, reported informally that the committee had not yet followed any specific line of conduct, but felt that it was best to see that what is done with regard to the compensation laws in different states is done right.

George M. Gillette, Minneapolis Steel



No. 11 shows the cope half of the combustion chamber and both cope and drag sides of the casting. No. 12 is the same as No. 11, except that the cores are set in the mold and the gauge is shown for locating the proper depth of the combustion core. No. 13 is the drag half of the combustion chamber, showing assembled core and the core in parts ready to be pasted together. No. 15 shows a section of the combustion chamber which is water cooled. This is to give an idea of the thin walls and the little variation allowed in the casting.



No. 14 shows the drag of the cylinder in the right center of the picture with the core in place. It also shows the assembled core at the left center; the assembled combustion chamber core on a jig, a complete set of cores ready for the pasters and in the immediate foreground the gauge for locating the barrel cores in the mold. This is a very difficult core to set in a green sand mold without shaving or scraping the sides of the mold. No. 10 is a view of the finished casting and is to be studied in connection with illustration No. 14.

EXAMPLES OF THE USE OF THE MOLDING MACHINE IN THE AUTOMOBILE CASTINGS FOUNDRY.

insurance companies, of which there were about 60 now doing business in the country. He intimated that there should be some sort of state control so that the good and bad risks would pay the proper rates and that in general

& Machinery Company, Minneapolis, referred to the Federal Commission now at work to draw up a bill for presentation to Congress. As such a bill is likely to be taken for a pattern for state legislation, and as the commission

has already intimated some of the lines of the bill, to which exception ought to be made, he felt that a close watchfulness of the proposals of that committee was quite important.

Mr. Gillette mentioned that the Federal idea seemed to be that workmen shall not contribute. He considered there was hardly anything more important also in respect to a compensation law than that there should be no compensation for at least two weeks after an accident, as otherwise there was likely to be a large amount of malingering. He was disposed to take exception with the representatives of the insurance companies who had stated that with the government experience there had been a greater percentage of accidents under the law. His understanding of the records was that accidents both in Germany and in England had decreased. There had been a great increase in the number of reported cases, but a decrease in the number of cases of permanent injury.

Imminence of Pro-Labor Laws

At the opening of the Thursday morning session Marshall Cushing, legislative representative of the association, at Washington, made a report on legislation. He mentioned that eight-hour agitation, the anti-injunction legislation as affecting labor and the general socializing process going on throughout the country are now more likely to develop laws than has ever been the case. He felt that such bills will undoubtedly pass in the House of Representatives and he did not engage to say what would happen in the Senate. He called attention to the fact that in the event the Sherman law is amended so as to not to apply to labor unions, the presidential veto is of course to be relied upon. With regard to the employers' liability bill as likely to be submitted through the commission now studying the subject, of which commission Senator Sutherland, Utah, is the chairman, he suggested that if the bill is not presented in December, it will undoubtedly appear in January.

Opening up the discussion on the proposed bill later in the session, Mr. Gillette explained that one of the things which staggered him is that not a single employing concern has expressed its view with regard to the kind of legislation it approves. Practically all of the discussion related to the constitutional restrictions of a bill of the kind. He believed that the commission would like to know the views of the employers, particularly as regards the limit of compensation. The National Founders' Association ought to take its part.

On motion of Mr. Schwacke, the attorney of the association, George M. Monaghan was appointed to take care of this work, to be assisted by a committee of members appointed by the officers. Incidentally a spark of humor was injected into the discussion by Theodore O. Vilter, of Milwaukee, who told how he had agreed to support a friend for member of Congress with the one stipulation which, on explanation to his friend, was stated to involve merely that the aspirant for honors should on taking his seat offer as his first resolution a motion that Congress should adjourn for two years.

Isaac W. Frank was of the opinion that each industry should carry its own burden and that agriculture should be so included. Statistics, he asserted, had shown that the farming industry produces a large percentage of accidents, and yet it would strenuously oppose a compensation movement of which it would have to sustain its part. Mr. Gillette added that if the commission was bound to present a bill to Congress, the committee of the association should confer in regard to the details. Incidentally statements by a number of the participants in the discussion went without contradiction, that there was probably a fairly unanimous feeling among the members present that some sort of a compensation measure was proper, the principal object being that the bill should not be one-sided, but the attitude of the employing element should be understood.

Present Business Conditions

What was styled by President Briggs as the real subject of the convention was the consideration of present business conditions. A report was received from a committee appointed by the Council to consider the subject. This committee, composed of J. H. Schwacke, C. H. Gifford and Philetus W. Gates, through Mr. Schwacke, offered a resolution, which, after a discussion highly in accordance with the resolution, was unanimously adopted. The resolution in full is printed in this account.

Mr. Schwacke said that he was deeply impressed with the fact that the association must not expect to develop successful counter agitation as a body, but the individual must carry the movement to his own locality and get boards of trade and other commercial bodies, and then the State, and finally the National Government, to consider the side of the subject which has not yet attempted specially to make itself felt. Business men, he said, are determined to have a voice in things affecting them so vitally.

Isaac W. Frank argued along the same line and said that it was high time that business men should assert themselves to offset the agitation which is calculated to indicate favor towards the laboring man who does not understand the importance of the question.

Mr. Gillette suggested that present business conditions are not entirely due to radical legislative movements. That had a great deal to do with the present condition of affairs but not all. One of the other factors was the national currency, a matter which ought to be settled absolutely right without regard to partisan feeling. Another question was the tariff matter, and he ventured that there is no divergence of views that this should be taken out of politics. A third influence affecting present conditions was the general relation of capital to labor. He was inclined to agree that wages were not adjusted to the high cost of living but under present conditions they certainly could not be raised. If the citizen asserts that politicians have found a low level, it is not because of politics but because the individual has not done his duty as a citizen.

In the concluding business of the meeting, on motion of Mr. Frank, it was voted that an additional sum of money should be invested in the association paper, the Review, to give it wider circulation for educational purposes.

Election of Officers

The report of the nominating committee was then submitted by T. L. Richmond, Buffalo Scale Company. In a brief address he explained that while President Briggs had decided he could not continue the office, owing to the fact that he was about to enter business, considerable pressure had been brought to bear to make him accept, and he was forthwith unanimously elected by the association. The remainder of the nominations were also unanimously elected and the officers and district committees for the next year are as follows:

President, O. P. Briggs, Minneapolis; vice president, J. H. Schwacke, William Sellers & Co., Inc., Philadelphia; secretary, F. W. Hutchings, Detroit; treasurer, People's State Bank, Detroit.

DISTRICT COMMITTEES.

First District—Henry B. Sargent, chairman, Sargent & Co., New Haven, Conn.; Thomas W. Fry, vice chairman, Sullivan Machinery Company, Claremont, N. H.; A. F. Corbin, Union Mfg. Company, New Britain, Conn.; E. A. Jones, E. D. Jones & Sons Company, Pittsfield, Mass.; D. K. Bartlett, Builders' Iron Foundry, Providence, R. I.

Second District—S. L. Moore, chairman, Moore Brothers Company, Elizabeth, N. J.; C. A. Chase, vice chairman, Syracuse Chilled Plow Company, Syracuse, N. Y.; E. S. Dean, United States Radiator Corporation, Geneva, N. Y.; W. H. Barr, Lumen Bearing Company, Buffalo, N. Y.; F. E. Wheeler, International Heater Company, Utica, N. Y.

Third District—Charles J. Mesta, chairman, Mesta Machine Company, Pittsburgh, Pa.; Thomas Shipley, vice chairman, York Mfg. Company, York, Pa.; Alexander Jarecki, Jarecki Mfg. Company, Erie, Pa.; W. R. McClave, McClave-Brooks Company, Scranton, Pa.; Stuart R. Carr, Stuart R. Carr & Co., Baltimore, Md.

Fourth District—H. J. Boggis, chairman, Taylor & Boggis Foundry Company, Cleveland, Ohio; C. H. Gifford, vice chairman, American Blower Company, Detroit, Mich.; William Gilbert, Buckeye Foundry Company, Cincinnati, Ohio; E. B. Perry, Industrial Works, Bay City, Mich.; C. E. Blue, Wheeling Mold & Foundry Company, Wheeling, W. Va.

Fifth District—H. T. Hornsby, chairman, United Iron Works Company, Springfield, Mo.; Staunton B. Peck, vice chairman, Link-Belt Company, Chicago, Ill.; J. H. Steedman, Curtis & Co., St. Louis, Mo.; James F. Lardner, Rock Island Plow Company, Rock Island, Ill.; E. E. Baker, Kewanee Boiler Company, Kewanee, Ill.

Sixth District—Otto H. Falk, chairman, The Falk Company, Milwaukee, Wis.; Oliver Crosby, vice chairman, American Hoist & Derrick Company, St. Paul, Minn.; Theodore O. Vilter, Vilter Mfg. Company, Milwaukee.

Wis.: J. L. Record, Minneapolis Steel & Machinery Co., Minneapolis, Minn.; Frederick Robinson, J. I. Case Threshing Machine Company, Racine, Wis.

Seventh District—L. L. Anthes, chairman, Anthes Foundry Company, Ltd., Toronto, Ont.; C. H. Waterous, Waterous Engine Works Company, Ltd., Brantford, Ont.; J. A. Kilpatrick, Canada Iron Corporation, Ltd., Hamilton, Ont.; George W. Watts, Canada Foundry Company, Ltd., Toronto, Ont.; William Harty, Jr., Canadian Locomotive Company, Kingston, Ont.

Eighth District—W. D. Tynes, chairman, Hardie-Tynes Mfg. Company, Birmingham, Ala.; W. E. McClamroch, vice chairman, Southern Engine & Boiler Works, Jackson, Tenn.; E. Y. Hartwell, Hartwell Iron Works, Houston, Texas; C. C. Huntington, Vesta Gas & Range Mfg. Company, Chattanooga, Tenn.; John H. McClure, Phillips & Buttorff Mfg. Company, Nashville, Tenn.

Activities of the Alumni

Succeeding the meeting on Tuesday afternoon of the Administrative Council, present and past members of the council, who have come to be styled the alumni, met in a dinner which was one of the social events of the annual meeting, as well as the occasion for outlining some of the destinies of the association. The activities, which were participated in by 40, all told, centered about the presentation to C. Bermingham, who incidentally has recently retired from active identification with the Canadian Locomotive Company, with a silver punch-bowl and ladle, designed by Tiffany & Co., New York. An idea of the character of the tangible indication of the regard in which Mr. Bermingham is held is given when it is mentioned that the two pieces contained 233 oz. of sterling silver. It is understood that the truth of the inscription on the bowl: "*Fecundi calices quem non fecere disertum*" (which in English means: "Whom has not the inspiring bowl made eloquent") was tested, as was also the cubic capacity of the bowl, which is given as 28 pints. The presentation was made by Frederic Nichols of the Canada Foundry Company, and Charles M. Jarvis, American Hardware Corporation, New Britain, Conn., acted as toastmaster. Most of the addresses related to the all-absorbing topic of the present condition of business. Among those who spoke were Philetus W. Gates, H. A. Carpenter, C. H. Gifford, F. B. Farnsworth, Isaac W. Frank, H. M. Wallis of the J. I. Case Threshing Machine Company, Henry B. Sargent, J. H. Schwacke and Harry Cockshutt of the Cockshutt Plow Company, Brantford, Ont., the last of whom took occasion to discuss the reciprocity question from the Canadian standpoint.

The Banquet

The annual banquet of the association was held Wednesday evening at the Hotel Astor. James Inglis, American Blower Company, was toastmaster, and there were two speakers, George P. Graham, late Minister of Railways and Canals, Canada, and recently accorded a seat in the Canadian Parliament by the resignation of a member, and Dr. George E. Vincent, president of the University of Minnesota. Mr. Graham's speech was particularly illuminating in regard to the small majority which carried the movement against reciprocity, and also with regard to the statesmanship obtaining in the country to the north. American newspapers, he emphasized, had little to say regarding Canada's political activity, while Canada is fully informed with regard to conditions in this country. Dr. Vincent's speech was a remarkable exposition of the present trend of human activity and incidentally it was delivered at the rate of 300 or 350 words a minute. In spite of its rapid-fire delivery, in fact, because of it, it hit the target repeatedly. Of this the diners were quickly conscious on the conclusion of his broadsides. No longer, said he, for example, should the novice in life be enjoined to paddle his own canoe; now we all travel in ocean liners.

At the meeting of the Administrative Council after the adjournment of the convention Commissioner McClintock and others of the association's staff were reappointed.

Hetherington & Berner, founders and machinists, have moved into their new home at Kentucky avenue and White River, Indianapolis, Ind. The buildings, which are

Action of National Founders' Association on Conditions Affecting Business

To the thoughtful citizen it is apparent that the tendency of much of the state and national legislation is to depress rather than to encourage activities which make for the country's material advancement and prosperity. Political and social unrest find expression in extreme measures which seriously disturb economic stability. Radical and unwarranted legislation is proposed as the panacea for every ill and every shortcoming. Political mountebanks feed upon prejudice and build upon hatred and selfishness. The pendulum of public opinion, therefore, has swung to extremes and has caused apprehension and uncertainty where confidence and certainty should prevail.

In the meantime a country whose normal temperament is hopeful and optimistic, a land of wonderful resourcefulness and boundless possibilities, of remarkable energy and constructive ability, is languishing under a prolonged industrial depression.

That the panic of 1907 was primarily a financial disturbance which should be followed by a period of industrial depression was to be expected. That this depression should be prolonged over a period of years is unwarranted and must be laid to causes which should and must be removed. Be it therefore

Resolved, That, in the judgment of the National Founders' Association, the time has arrived when the country should awaken to the real situation, discountenance public expressions and legislative action designed to discourage legitimate enterprise and commercial and industrial development and denounce the political tinkers who destroy confidence and undermine the economic stability of a great nation. And be it further

Resolved, That we bespeak for the American people a returning confidence in themselves, a conservative attitude on all controversial problems and the application of sane methods to their solution; a more friendly co-operation between capital and labor, between employer and employee; that we impress upon the agencies of government the duty to promote rather than retard the progress and prosperity of a whole people.

fireproof, cover about three acres and include a structural steel shop with 12,800 sq. ft. of floor area; foundry, 13,600 sq. ft.; machine shop, 13,700 sq. ft. with a mezzanine floor as a pattern shop with 10,000 sq. ft.; office building with engineering and drafting departments on the second floor; power house, with both steam and electric energy, and a large blacksmith shop and storage buildings. In all there is a total of more than 70,000 sq. ft. of floor area. Saw tooth roofs and plenty of large windows give ample light, and the equipment is of the most modern type, including electric hoists in the yards for loading and unloading cars. The establishment does a general mechanical business, giving special attention to asphalt plants and machines for making encaustic tile. It was founded in 1867 by B. F. Hetherington and Frederick Berner, Sr., and is now controlled by their descendants.

Labor in the Iron and Steel Industry

The first volume of the special report of the United States Bureau of Labor on "Conditions of Employment in the Iron and Steel Industry" will soon be ready for distribution. It is entitled "Wages and Hours of Labor" and constitutes the first results of an investigation in response to a Senate resolution of June 23, 1910, introduced by United States Senator Borah. The information upon which this volume is based covers practically all the iron and steel workers in the United States. All iron and steel producing localities are represented, and the number of plants included in the study is 344.

Hours of Work

This report includes only the basic iron and steel occupations that are closely connected with production, the occupations extending from the blast furnace through the rolling mill. Out of over 90,000 employees for whom information was secured the customary working week for one-third was a seven-day week. Approximately one-fourth of the 90,000 employees worked 64 hours or over per week which, in effect, means a 12-hour day every day in the week, including Sunday.

The investigation further developed that the seven-day working week was not confined to the blast furnace department where there is a metallurgical necessity for continuous operation, and in which department nine-tenths of the employees worked seven days a week, but it was also found that to a considerable extent in other departments, where no such metallurgical necessity existed, productive work was carried on on Sundays just as on the other days of the week. For example, in some establishments the Bessemer converters, the open-hearth furnaces, and blooming, rail and structural mills were found operating seven days of the week for commercial reasons only. The most common plan for operating under this schedule of hours was to work one shift of employees on the day of change of shift through the entire 24 hours, the succeeding shift working the regular 12 hours when it came on duty. In some plants the change was effected by having one shift remain on duty 18 hours and the succeeding shift 18 hours.

Other industries where continuous operation is necessary have found it practicable to devise a system by which one day of rest out of each seven could be secured for each employee; and since the beginning of this investigation by the Bureau of Labor a committee of the American Iron and Steel Institute has taken up this subject and has proposed a plan which gives each employee one day of rest each week, and which does away with the 24 or the 18 hours of consecutive work now required when changing from the day shift to the night shift. The plan is now being given a test in a few plants and may be adopted generally throughout the iron and steel industry.

The detailed tabulations of the report show that of the 90,599 employees studied, 44,993 (49.68 per cent) had a working week of 72 hours or over, which is, in effect at least, a 12-hour day of six days a week. Approximately one-third of all the employees (31.17 per cent) had a regular working week of more than 72 hours, which practically means work on Sunday. More than 22,000 (24.63 per cent.) had a working week of 84 or more hours, or at least 12 hours every day of the week, including Sunday. Approximately three-fourths of all the employees had a working week of over 60 hours; 10.80 per cent. of all the employees had a working week of just 60 hours, while only 15.81 per cent. had a working week of less than 60 hours.

Earnings

Of the total of 90,599 employees included in the investigation, 3,495, or 9.38 per cent, earned less than 14 cents per hour; 10,883, or 12.01 per cent, earned 14 cents and under 16 cents, and 25,535, or 28.18 per cent, earned 16 and under 18 cents. Thus 44,913, or 49.57 per cent of all the employees, received less than 18 cents per hour. Those earning 18 and under 25 cents per hour numbered 22,975, or 25.36 per cent, while 22,711, or 25.07 per cent, earned 25 cents and over. A few very highly skilled employees received \$1.25 per hour; and those receiving 50 cents and over per hour numbered 3,915, or 4.32 per cent of all employees.

In general the earnings of less than 18 cents per hour

represent unskilled labor. The group earning 18 and under 25 cents per hour consists of semi-skilled workmen, while those earning 25 cents and over per hour are skilled employees. The most common rate per hour for unskilled labor in the New England district was 15 cents; in the Eastern district 13 and 14 cents; in the Pittsburgh district 16 and 17 cents; in the Great Lakes and Middle West district 15, 16, and 17 cents; and in the Southern district 10, 12½, 13, and 13½ cents.

The Superiority of Steel Cars

A striking demonstration of the security to passengers accomplished by the use of steel cars occurred November 17, when a fast train on the Pennsylvania Railroad left the rails near Monmouth Junction, N. J. The train was running at 50 miles an hour, and in taking a crossover switch the locomotive was overturned, fatally injuring the engineer and the fireman, both dying that night. Although two cars filled with passengers left the tracks, and the others were stopped suddenly, there was no telescoping nor buckling. No one of the 200 passengers received so much as a scratch, and not a window pane was broken in any of the cars. There was no wood in the train, every car from the baggage car to the rear day coach being of equally strong steel construction, with cement floors and steel window frames.

This occurrence strongly emphasizes the points brought out with regard to the superiority of steel cars in a communication received a short time before from the Dahlstrom Metallic Door Company, Jamestown, N. Y., extracts from which are given below:

"In almost all wrecks of wooden cars a great many of the people injured or killed are struck or pierced by splinters from the wood. This would not happen with steel cars, because the steel would not split up and cause such injuries.

"It is fully as important to have cars fireproof nowadays, in spite of the use of electric light and steam heat, as it ever has been. A case illustrating this point was the wreck on the Lehigh Valley Railroad some months ago, when an excursion train was derailed and came in contact with some oil tanks standing along the track, flooding the wreck with oil which caught fire and burned fiercely, the wooden cars, of course, adding fuel to the flame, and causing the death of eight persons out of eleven killed. Furthermore, it is only necessary to refer to any number of fires occurring in buildings, owing to defective electric wiring. If a fire will occur in a building from this cause, there seems to be just as much danger in wooden cars from similar causes.

"It is also a fact that the steel interior finish of a car is more sanitary and of a more pleasing appearance than a wooden car. The steel cars are more easily kept clean, which can readily be verified by asking any of the crew of any given train in the steel cars. The elimination of carved ornaments and deep paneling which are so prominent in the wooden cars, and which only form harboring places for dust and germs, makes the steel car entirely sanitary. It is also a fact that germs and insects do not thrive on steel as they do on wood.

"The all-steel dining cars are much preferred by the porters and conductors to the wooden cars. The porters of the Pullman sleeping cars find them much more convenient and easy to take care of, and we believe that any passenger will prefer the all-steel cars and be more comfortable on account of the added sense of security in case of accident which such a car would give him.

"Naturally the idea of giving up wood for interior finish will die hard and be fought against by the hardwood interests. But the fact remains that the practical car builders and the officers of the more prominent railroads who have given the matter close study are all in favor of the steel-car construction, so that without a doubt the steel car has come to stay and to be a factor in more safe and comfortable railroad travel."

The filing of the incorporation of the Woodward Iron Company, capital \$13,000,000, at Dover, Del., is an incident of the acquisition of the Birmingham Coal & Iron Company by the Woodward Company. The latter previously had a capital of \$3,000,000.

To Prevent Leaks in Overhead Costs

The Bullard Machine Tool Company's System of Constant Vigilance Which Has Decreased the Burden Materially

The great expense leaks in a manufacturing plant are for the most part in the overhead cost. The cost system of course itemizes the burden into its various elements. But while the information is always available to the watchful manager it must be put into form to serve the useful purpose, so that its details are made as obvious as those of the labor and material accounts. The value of a critical, continuous analysis has been proved by experience to yield rich rewards.

The Bullard Machine Tool Company, Bridgeport, Conn., has had in operation for some time a system of weekly comparisons of overhead costs. A detailed separation of items was first made, grouped homogeneously for greater convenience. A weekly appropriation was set for each item, this being the average cost covering a period of three years. The system plays no part in the bookkeeping. The appropriation is not, literally speaking, what the name might signify, but rather an amount for use in comparisons, from which economies or increased expenditures may be reckoned. The figures are for the information of the management, arranged in form for convenient inspection and filing. It is the basis of serious study of the various factors of costs, with the purpose of reducing them wherever possible. It is a sentinel which cannot be passed without a challenge. Each week the several sheets required for the headings, filled out by the accounting department, are inserted in small loose-leaf books, each interested official having his own. A sample leaf is shown in Fig. 1. The amounts used are wholly fictitious.

Series "L"		Date.....	
No.	Name	Appr.	Excess Exp.
11000	Changes on Dwgs. & Bluep'ts	20	5.25
11001	Rep. and Alt'ns to Patterns	15	
11002	Work in Pattern Room	10	
11003	Cost Accts., Bonus, Invt., etc.	55	
11004	Inspectors and Testing	106	11.50
11005	Tool Room Keeper's Time	24	
11006	Cranes and Elevators (oper.)	75	
11007	Electric Lights	12	
11008			
11009	Watchman (Day)	12	
11010	Millwright, Belts, Pulleys, etc.	25	
11011	Sweeping and Cleaning	80	
11012	Wash Room	12	
11013	Truck, Unloading Castings, etc.	95	
11014	Oiling, Ice	15	
11015	Rep. to Small Tools, Gen. Use	25	
11016	Automobile Repair, Supplies	5	
11017	Changes on Tool Drawings	10	
11018	Shipping	45	
11019	Experimental Work	8	
11020	Messenger & Delivery Service	16	
11021			
		665	615-75
	Efficiency 108 per cent		

Fig. 1—A Sample Sheet of the Weekly Overhead Report of the Bullard Machine Tool Company.

Against the items is a column for the amount of the appropriation and another for the excess expenditure, if it should exist. The footings are the total appropriations of the sheet, and the total expenditures, including the excesses. Only the latter are enumerated by items, but the total has the whole cost. Each sheet also contains the per cent. of efficiency, which is the comparison of the expenditures to the appropriation. In this particular case

it is 108 per cent. In the several sheets every division of overhead is included, and the total relation in percentage is given, comprising the totals of all sheets. If expenditures exceed appropriations the percentage of efficiency is below 100. If expenditures are less than the appropriations the efficiency is above 100. It must not be lost sight

Series "L"		Date.....	
No.	Name	Appr.	Excess Exp.
11100	(Closed)		
11101	Rep. & Mov. 30" M No. 5702		
11102	" " 18" VTL No. 6156		
11103	" " 24" VTL No. 6011		
11104	" " 24" VTL No. 6043		
11105	" " 36" VTL No. 6141		
11106	" " 36" VTL No. 5758		
11107	" " 42" Std. No. 5587		
11108	" " 42" R.P. No. 5550		
11109	" " 42" R.P. No. 6266		
11110	" " Type HA Grinder		
11111	" " Type DA Grinder		
11112	" " 36" VTL No. 6244		
11113	" " 36" VTL No. 6214		
11114	" " 36" VTL No. 6232		

Fig. 2—The Weekly Report Which Gives the Burden Charges Against Bullard Machines in the Home Works.

of that 100 per cent. is what these costs were on an average in a period of three years, and therefore an excess above 100 per cent. efficiency means that amount of saving. In actual practice the use of the system has resulted in a decreased expenditure of funds for overhead costs that amounts to a handsome sum.

In the beginning of the system, each item of the weekly comparison was critically studied. Abnormal expense was found in various departments of the analysis. Excessive non-productive labor was brought to the surface and removed. The systematized study revealed a wastefulness, hitherto unsuspected in a plant much better managed than is usual. Better methods were devised in order to cut costs. The first few months yielded handsome returns on the labor involved in the task.

Fully as important, perhaps more so in the long run, is the constant check which the system affords. Each increase over the appropriation is immediately questioned. As it appears in figures within the week of its occurrence, no time is wasted. A few minutes of study, glancing through the list, tells the story, and the machinery of further investigation is immediately started. In some cases the increase is justified; in others it is checked immediately. Not only are the leaks stopped, but the opening of new ones is made impossible. A single week is no final criterion, of course. An average of weeks is computed from time to time.

A sheet of special interest is seen in Fig. 2, which is given over to the overhead costs of individual machines in the company's works. Most of them are Bullard vertical lathes or boring mills in commercial operation, or under experiment. The management has quick and sure information as to items of expense which might indicate weaknesses or defective design in an experimental tool, or exceptional conditions in a standard machine.

The items of other sheets are as follows:

Repairing buildings and elevators; repairing boilers, engines and pumps; repairs to line shafts, improvements; electric expense (power); engineer, fireman, oiler; sprinkler expense; cleaning boilers; new building.

Miscellaneous; Y. M. C. A. industrial education; disk grinders, truing emery wheel, etc.; repairs of machines and fixtures; setting up new machine and equipment; cleaning shop machines.

Preparing for photographs; estimates, tool layouts, proposition drawings; demonstrating; refinishing returned accessories; repairing and refinishing returned machines and accessories.

Foremen; repairs to large tools; care of patterns; repairs to small tools, jigs.

The Heat Treatment of Steel*

A DISCUSSION OF EQUIPMENT AND METHODS EMPLOYED

The Composition of Steel and Processes of Manufacture—Heating and Annealing Furnaces and Quenching Mediums—Notes on Case Hardening

BY JAMES H. HERRON, CLEVELAND†

In any paper relating to the heat treatment of steel it is necessary to consider not only the different classes of steel, as defined by their methods of manufacture, but each part separately of the equipment of the heat treating plant, in order that a full understanding may be had of the material treated and the methods of treatment.

As the length of this paper will not permit a consideration of all steels, it will be confined solely to carbon steel used for manufacturing purposes and from a low carbon content to approximately carbon of 1 per cent. Special carbon steels, alloy steels and tool steels cannot be considered, because each in itself would require as much space as can be allowed for this paper. The subject of heat treatment can only be considered in a general way, with the exception of case hardening, where definite treatment can be given, owing to the practically fixed composition of the steel.

The writer will endeavor (1) to give, briefly, the methods used in making steel, and (2) to describe each part of the equipment of the heat treating plant and its use.

Processes of Steel Manufacture

Bessemer: The iron should be delivered to the Bessemer converter in the molten state and practically free from all elements but carbon, silicon and manganese. The quantity of air blown through the metal oxidizes these elements with an evolution of sufficient heat to raise and maintain the mass at a high temperature. It is impossible in the Bessemer converter to eliminate the sulphur and phosphorus. The former can be taken care of in the blast furnace, but there is no means of eliminating the latter. It is, therefore, present in the iron and remains in the steel as an impurity. One very particular disadvantage of the Bessemer process is the amount of oxygen and nitrogen remaining in the steel from the air which is blown through the metal when liquid. These are impurities and weaken the steel physically in proportion to their amount. An iron high in carbon and manganese is usually added to the molten steel before pouring—the carbon to recarburize the mass and the manganese to unite with some of the oxygen present; the resulting oxide passing off in the form of slag. Bessemer steel should rarely be used.

Open Hearth: In the basic open hearth process there is the opportunity to remove not only the same elements eliminated in the Bessemer process but also phosphorus. The removal of phosphorus is accomplished by the use of basic material, such as magnesite, burnt dolomite and lime, for a hearth lining, and limestone which is added to the bath. The slag thus formed with the impurities in the charge is strongly basic and takes up the phosphorus. As a small amount of phosphorus is detrimental this steel is not only better in this respect, but it contains less oxygen and nitrogen, due to the fact that the air is not blown through the steel but drawn over it. This renders it much purer and physically it has from 10 per cent. to 25 per cent. greater value than Bessemer steel of the same composition. For all general purposes the use of open hearth steel is strongly advised.

Electric: The electric process is principally used to purify steel already made by the basic open hearth process. Not only can the elements above mentioned be eliminated in great part, but the sulphur also. Owing to reducing conditions and the high temperatures present in the electric furnace, the oxides are reduced and the dissolved gases liberated. The metal produced is very pure, con-

taining a minimum amount of the objectionable impurities. This method is especially adapted to the manufacture of alloy steel, where alloying metals can be mixed with the charge in the furnace and thoroughly melted before pouring. This gives a better distribution of the alloying element throughout the mass. Such steel physically is from 30 per cent. to 60 per cent. greater value than open hearth steel of a similar composition; and while the cost is higher, for some classes of work this additional cost is fully justified.

Crucible: Owing to the fact that comparatively little steel, except for use in tools or having a high carbon content for special purposes, is now made by the crucible process we will not discuss this method of steel making.

The Composition of Steel

Of the elements entering into the composition of steel some are of value while others are a detriment. The value of the steel is determined largely by these elements. Not only should their presence be considered, but the amount of each should be accurately determined.

Carbon: The general influence of carbon on steel is to give greater tenacity. It also renders the steel harder and stiffer. The tensile strength is increased about 600 to 800 lb. per square inch for each additional point of carbon, while the ductility is decreased about 0.5 per cent. for each additional point of carbon. Steel with 0.20 per cent. carbon begins to show appreciable hardening when cooled quickly, but does not show evidence of brittleness in the normal state until the carbon has reached approximately 0.70 per cent.

Manganese adds to the toughness of steel and increases the tensile strength by about 100 lb. per square inch for each additional point. The ductility is decreased with the addition of manganese. For medium steel the manganese is very satisfactory at from 0.40 to 0.60 per cent. Higher or lower manganese may be specified for special purposes. Steel with manganese of more than 1 per cent. should be avoided except in special cases, because of increased hardness and a tendency to brittleness.

Phosphorus renders steel cold short or brittle. It is, therefore, to be avoided as much as possible. The lower the phosphorus content the better, with the exception of springs, where there should be a minimum as well as a maximum limit. Steel should be specified with phosphorus not to exceed 0.40 per cent. This is the specification for good open hearth steel.

Sulphur has a tendency to render the steel hot short and is, therefore, to be avoided in any steel that is to be forged or otherwise worked hot. Sulphur is detrimental to steel that is to be quenched in any way. The quality of hot shortness renders it brittle, and is likely to cause much trouble, especially in case hardened work. The sulphur, for good results, should not exceed 0.05 per cent. and it is much better to keep it below 0.04 per cent.

Silicon is generally supposed to render steel cold short. It should be avoided in steel for general purposes and should not exceed 0.20 per cent.

Oxygen and Nitrogen: Little attention seems to have been given in the past to the oxygen and nitrogen content of steel, but this is becoming an important matter. In the near future, doubtless, determinations of these will be included in chemical analyses and a maximum specified. They are found as free gases, also as oxides and nitrides. These are impurities and therefore weaken the steel to the extent in which they are present. Doubtless the presence of the oxygen renders the steel susceptible to high temperature by burning.

*A paper read at the monthly meeting of the Metal Trades Superintendents' and Foremen's Club of Cleveland, November 18, 1911.

†Consulting Metallurgical Engineer.

Slag: More or less slag is found in steel. As this has a weakening tendency, steel in which it is excessive should be avoided. The usual way to determine approximately the amount of slag present is by the microscope. Few specifications have been written including the slag content, but this will probably be a serious consideration in the future.

Heat-Treating Equipment

For the successful heating of steel, the matter of furnace design is very important. Of the two classes of furnaces—the forging furnace and the annealing and heat-treating furnace—the latter is the one generally used for case hardening purposes, with and without modifications.

FORGING FURNACES

In forging furnaces the arch should be so constructed that the maximum temperature is got in the heating zone. This is accomplished by placing the burner somewhat above the line of heating. The flame impinges upon a half arch, which causes it to roll back through the heating zone. In this way the combustion is probably complete before the gases come in contact with the material to be heated, and the result is much cleaner heating than is possible by the flame from the burner playing directly upon the material to be heated. Fig. 1 shows the brickwork for this type of furnace. The burner at O may be varied vertically somewhat, depending on the character of the flame. A burner giving a horizontal fan-shape flame can be set closer to the heating zone than the burner giving the cone-shape flame.

All oil fired furnaces should be supplied with cover plates to the burner openings, so that when the burner is shut off the opening may be closed to prevent the heat of the furnace carbonizing the oil on the face of the burner.

ANNEALING AND HEAT-TREATING FURNACES

The ideal annealing and heat-treating furnace is the muffle type; but since this is not practical in large furnaces, the nearest approach to it must be considered. In such a furnace the combustion chamber is either provided under the hearth or at the side, and of sufficient size to insure complete combustion. The former seems to be much more satisfactory, and therefore is more generally used. The ports leading from the combustion chamber to the heating chamber should be so arranged, for position and size, that the heating chamber may be heated uniformly. In a well designed furnace the temperature of the heating chamber should not vary in all of its parts more than 20 deg. F. The heating chamber can be made of a suitable size to take care of the work to be done. In any heat-treating furnace the flame should not under any circumstances come in direct contact with the material to be heated. Fig. 2 illustrates a type of furnace with combustion chamber under the hearth. In this case the burners are at O in the front of the furnace. The burners can be conveniently arranged either on both sides or on one side. In the latter case the wall in the center supporting the floor tile should be arranged in piers.

There are numerous modifications of heat-treating furnaces, with burners and outlet openings placed in different positions, and with the baffling arrangement in the combustion chamber somewhat varied to suit the ideas of the designer. There seems to be a wide variation possible, and still obtain good results. All heat-treating furnaces should be provided with covers to the burner openings in order that the furnace may be completely sealed if necessary.

Fuel

A number of different fuels are satisfactory for annealing and heat-treating, but we shall consider only two, since coal and coke have been largely replaced by gas or oil. Gas is an ideal heating medium where the natural product can be obtained, but where it is necessary to use manufactured gas the cost is prohibitive. The regulation of the gas flame is in the hands of the operator, and small variations of temperature can be secured with little trouble.

Oil can always be used because it can be obtained readily in almost all sections and delivered in bulk, and at such prices, compared with its heating value, that it is probably the most economical fuel that can be obtained. Oil to atomize freely should not be too heavy, and satisfactory results are obtained between 36 and 30 deg. Baume

without preheating. The prime essential in the use of oil as fuel is to thoroughly atomize the oil and supply enough additional air to insure complete combustion. In cold weather all oil should be preheated, preferably by heating coils in the supply tank.

Atomizing Mediums

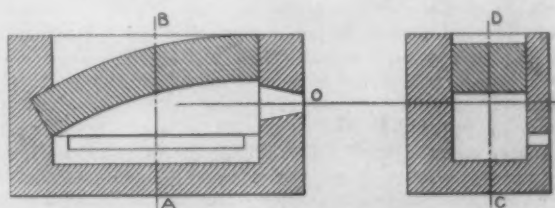
Dry steam is probably the most satisfactory atomizing medium but is usually unsatisfactory to use on a large number of furnaces or where the distance it is carried is great. Air, therefore, is generally used either at a low or high pressure. The former at about 2 lb. pressure gives very satisfactory results; the latter at about 15 lb. pressure seems to give equally satisfactory results. The results are, of course, contingent upon the design of the burner. In some installations high pressure air is used for atomizing and low pressure air, furnished by fan, is used for combustion.

Control of Temperature

For all important work the use of some reliable pyrometer is strongly recommended. Most pyrometers should be checked frequently against some standard. For those who are unwilling to check their pyrometer constantly the trained eye is much safer to rely upon. A pyrometer that is not kept checked and is depended upon may give bad results and be the cause of much of the failure that cannot otherwise be accounted for.

In the thermo-electric pyrometer the tube should be located as nearly as possible in the same zone as the object to be heated, and in some cases it should be in direct contact with this object. It should in no case be subject to the direct action of the flame, and in some special cases it is desirable to shut off the furnace entirely for some minutes before making the observation. The thermo-electric couple may be checked by comparison with some standard or at the known melting point of some metal; the metal to be in the pure state. An excellent article on "Checking Pyrometers in Service," by R. W. Davenport, was published in the American Machinist of January 12, 1911.

A number of optical pyrometers are on the market, which have in some cases proven satisfactory. The instrument is focused directly on the object and the tem-



Section C-D

Section A-B

Fig. 1.—Bricking for Forging Furnace.

perature is determined by the comparison with a filament or flame of known temperature. This has one evident advantage—that it gives the temperature of the object regardless of the temperature of the furnace.

The radiation pyrometer for high temperatures has proved very satisfactory. In this case the thermal couple does not come in contact with the heat but is in the instrument. The instrument is focused upon the heated object and the temperature indicated or recorded by a suitable instrument.

In working without a pyrometer and relying on the eye, the light surrounding the furnace should be dull, and should be kept as nearly constant as possible in order that the eye may not be misled by the changing contrasts between the surrounding light and that of the object heated. In particular, direct light should be excluded and any arc or other strong lights should be so placed that neither they themselves nor any concentrated part of their light is in the field of the operator's sight, when he is estimating by eye the temperature of the objects heated. Of course, allowances should be made for the character of the day and whether work is being done in the day or at night.

The magnet has been somewhat used to determine the proper annealing and hardening heat. This applies only to steels containing between 0.50 per cent. and 0.90 per cent. carbon, since steel with less than 0.50 per cent.

carbon ceases to be magnetic before the hardening or annealing temperature is reached. The magnet should be frequently applied after the heated object has reached approximately the annealing and hardening heat. When the magnet no longer "holds on" the proper heat is reached. In the use of the magnet care should be taken that it is not heated sufficiently high to lose its magnetism.

Quenching

The size of quenching tanks required for any particular class of work will depend upon the size of the pieces to be treated. It is generally customary to have tanks of from 150 to 250 gal. capacity. Where the pieces are very large the capacity of the tank should exceed this.

The selection of a quenching medium is at times very important. Except in special cases high carbon steel should not be quenched in water. Oil should invariably be used. Low carbon steel, or steel below 0.30 per cent. carbon, may be quenched in water or brine. It is better as a rule to quench thin pieces in oil regardless of their carbon content.

Forethought and care are necessary in the method of quenching, regardless of the medium. A piece should be quenched in such a manner as to cause the least distortion, or so that the distortion may be symmetrical. Where thick and heavy masses of metal are adjacent to thinner and smaller masses, the hardener will have to use his judgment as to the best method of quenching. It is generally customary to quench the piece in such a way that the heavier parts come in contact with the quenching medium before the thinner parts. It is seemingly quite important in what manner a piece is soured in the quenching medium. These are points to which the hardener should give a good deal of thought before undertaking the operation itself. In many instances it may require special facilities to do the work properly, but these are usually justified.

The most general medium for quenching is water. This should be in a constant state of circulation so that the temperature may remain uniform.

Oil quenching in heat treating has become deservedly popular. The oil used should be a medium oil of flash test, from 300 to 500 deg. F. Fish, lard and cotton seed oils have been used extensively, but mineral oils, costing much less, are rapidly replacing these more expensive oils. The oil should be so cooled that the temperature does not at any time exceed 90 to 100 deg. F. This is at times accomplished by a central cooling system, using pump circulation. At other times individually cooled quenching tanks are used.

Water covered with a few inches of oil is used where the piece should be hard, but where quenching in water would probably cause hardening cracks. The shock in quenching is not as severe as in the case of water, and the steel becomes nearly as hard. The only way to keep such a tank cooled is by water jacket.

For parts that should be exceedingly hard brine may be used, about 20 per cent. solution by weight or of the density to float a potato. The brine should be kept cooled after the same manner as oil, either by circulating through cooling coils or using a water jacket to the cooling tank.

Temperature

The proper temperature at which any steel is to be heat treated should be determined in advance. This temperature may be determined by the chemical composition of the steel, or by plotting a cooling curve and noting the point of recalescence. The critical point in heating is about 50 deg. above the point of recalescence, observed in cooling. In annealing or heat treating the critical point in heating only should be used. Some definite temperatures will be considered in the following paragraphs on annealing, heat treating and case hardening.

Heating

The flame should be neutral or slightly rich if anything. This will prevent scaling in heating for forging purposes and surface decarbonization in annealing and heat treating. Great care should be exercised in the time required to bring the object to the right temperature. Heating should not be rapid, except possibly in the case of large objects, where the heating of the interior lags behind that of the exterior. This should only apply to the early part of the heating, the final approach to the

temperature aimed at should be slow, so that the interior may be brought fully up to this temperature without carrying the exterior far beyond it. In unequally heated pieces stresses are set up which may cause their failure. Many of the bad results that the steel has been held responsible for are, in fact, the fault of heating. The steel when heated uniformly will have a translucent appearance; that is, no variation of color will be noted when examining the surface. When steel is not heated through it will appear darker toward the center of the exposed surface; and until this effect entirely disappears steel should not be withdrawn from the furnace. The heater should exercise considerable care so that no part of the object will be overheated or underheated to any great extent. Overheating causes a coarse, weak structure. Underheating, especially in soft steel, tends to have the same effect; the steel also showing signs of brittleness. After steel has reached the proper temperature it should not be kept in a soaking condition for any length of time. A rule of thumb sometimes used is five minutes per inch of thickness of the object heated. This will probably insure the refining of the grain. In the case of annealing the steel may be permitted to cool in the furnace. In hardening it should be immediately withdrawn and quenched before the temperature drops perceptibly.

Annealing

The purpose of annealing is not only, as seems to have been the impression somewhat current, to soften the steel but to refine the grain. It relieves the stress set up in the steel by rolling, forging and other working, at a low heat. This temperature is determined as above stated and should be sufficiently high to exceed the critical point. In general the higher the carbon content the lower the annealing temperature; therefore different temperatures are used for different ranges of carbon content. The following ranges of temperature are recommended by the American Society for Testing Materials.

Ranges of Carbon Content.	Ranges of Temperature.
Less than 0.12 per cent.	1607 to 1697
Less than 0.12 per cent. to 0.29 per cent.	1544 to 1598
Less than 0.30 per cent. to 0.49 per cent.	1499 to 1544
Less than 0.50 per cent. to 1.00 per cent.	1454 to 1499

These refer to the usual manganese content. For steels with more than 0.75 per cent. manganese slightly lower temperatures may be used. In order to bring the interior of large objects to an effective annealing temperature the outside may be often advantageously raised somewhat above that temperature. Therefore a range of temperatures is given for each range of carbon content. The upper limit of this range applies to larger objects and also to the lower range of carbon content given.

Parts that are to be subsequently heat treated in a finished condition should be either annealed in the rough or rough machined state. This will prevent undue distortion when the final hardening takes place, by relieving the internal strains set up by forging, rolling, etc., and before quenching, which would set the distorted condition.

Cooling

The rate of cooling should be regulated to suit the carbon content of the steel and the physical properties desired. The higher the carbon the slower should be the cooling. Also, the slower the cooling the softer and more ductile the steel, and the lower will be the elastic limit and tensile strength. Objects containing more than 0.50 per cent. carbon and thin objects of more than 0.25 per cent. carbon should cool slowly in the furnace, in lime or in clay until they become black, when they may be removed. Thin objects of less than 0.25 per cent. carbon and thicker objects of less than 0.50 per cent. carbon may be cooled in the air if they are protected from the weather and from sharp draughts of air. In case great softness and ductility are desired, all steel should be subjected to slow cooling. Where a greater elastic limit and ultimate strength are desired, cooling in air is advisable even in case of thin objects over 0.25 per cent. carbon and thicker objects over 0.50 per cent. carbon. They can be cooled in air by being massed together to retard somewhat the cooling.

The so-called "normal steel," to distinguish it from annealed steel, is that which is received from the mill, or the forge plant, before regular annealing is done. Annealing in charcoal is only advisable where the carbon content exceeds 1.00 per cent.

"Heat Treating"

The foregoing process of annealing is in fact heat treating, but the term "heat treated" is usually meant to distinguish steel which has been through a toughening process by heating, quenching and subsequent partial annealing. The simplest form of heat treating is as follows: After forging or machining.—1. Heat to the annealing temperature. 2. Quench. 3. Reheat to 600 to 1200 deg. F. and cool slowly.

The drawing operation (3) should be varied to suit each individual case. The higher the temperature of this operation the softer and more ductile is the steel, but the lower the elastic limit and ultimate strength. This, of course, makes a tough structure. If less toughness is required and greater strength, the temperature of the drawing operation should be lower. For some classes of work the drawing operation can be entirely omitted.

Better results than with the above treatment may be obtained by the so-called double treatment as follows: After forging or machining.—1. Heat to annealing temperature. 2. Quench. 3. Reheat to 50 deg. less than the initial temperature. 4. Quench. 5. Reheat to 600 to 1200 deg. F. and cool slowly. This double treatment produces a refinement of grain which is not possible with the single treatment, and should be resorted to for parts where extremely good qualities are desired. By varying the temperature of the drawing operation (5) high elastic limits may be obtained, up to nearly double the amount in the annealed material, while if greater toughness is required the higher drawing temperatures may be used. Steel subjected to this treatment is excellent to withstand shock and alternate stress.

For steel with carbon exceeding 0.40 per cent. a still more elaborate process of heat treatment may be used: After forging or machining.—1. Heat to about 50 deg. above annealing temperature. 2. Quench. 3. Heat to annealing temperature. 4. Cool slowly in furnace in lime or clay. 5. Reheat to about 50 deg. F. below annealing temperature. 6. Quench. 7. Reheat to 800 to 1000 deg. F. and cool slowly. Steel subjected to this treatment has high fatigue resisting qualities, and can be used for parts that require a high elastic limit and tensile strength, but a relatively low ductility.

The above are the most general methods of heat treatment, and can be varied to some extent to suit special cases. It is impossible in this paper to give anything except that which would apply in a general way, since it is not discussing steel of any particular composition.

Case Hardening

Case hardening is one of the most important branches of heat treatment. Where objects are required to have a tough core and a very hard surface, this is the most satisfactory method for such requirements. Steel from 0.18 per cent. to 0.25 per cent. carbon gives the best results for this class of work. Of the different methods used in case hardening, we shall take up but two that may be considered within the range of this paper. In one method, which is of limited application, cyanide of potassium is used in a molten or in a powdered form. The former is convenient for small objects, such as the parts of typewriters, adding machines, etc. The most generally employed method is packing the material to be case hardened in either cast iron or wrought iron boxes, in a compound the base of which is carbon.

CARBONIZING COMPOUNDS

Raw bone can be used where the pieces are of considerable size. Thin pieces should not be packed in raw bone; owing to its high phosphorus content, it has a tendency to cause brittleness in the parts. A mixture of granulated bone and granulated charcoal has proved very successful. Expanded bone, about two parts mixed with one part of raw bone, seems to be a fairly satisfactory mixture. Small screws and other parts can be carbonized in expanded bone only. Charred leather is a very satisfactory carbonizing material, and is quite extensively used,

although in some cases the cost is prohibitive. Bone black, or animal charcoal, is very frequently used, and gives very satisfactory results. This is sometimes saturated with a carbon oil and is called Hydro-Carbonated Bone Black. It seems to be effective and the only objection to its use is that it carbonizes with the evolution of some smoke, which is objectionable when the furnace is not provided with a flue. A number of special compounds introduced by several manufacturers have proved very satisfactory. These give uniformity of case, which strongly recommends their use on particular classes of work.

METHOD OF PACKING

The size of box depends upon the size of the parts to be carbonized; it should be of such shape that the heat will readily penetrate to the center without too long an exposure. The pieces should not be placed closer than 1 to 1½ in. to the side or bottom of the box, but can be placed within ½ in. of each other. The cast iron, of which most boxes are composed, has a strong affinity for carbon and will therefore decarbonize the pieces that are placed in too close proximity to it. The cover should be placed upon the box and sealed with fire clay. This is quite important, because the gases generated in the decomposition of the carbonizing material enter the steel in its expanded state and assist in the operation.

HEATING

The depth of case depends upon the temperatures at which the pieces are heated and the length of time exposed

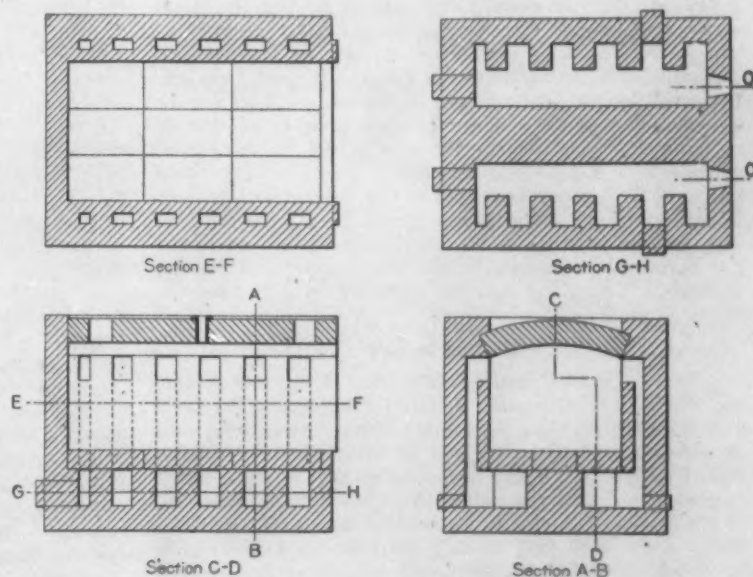


Fig. 2.—Bricking for Small Heat Treating Furnace.

to the full heat. This will give as a rule from 0.010 to .015 in. depth of case per hour of exposure. Test wires are convenient to determine when the interior of the box has reached the temperature of the exterior. These wires are about 3/16-in. diameter and are inserted through holes in the cover. As the heating progresses the wires are withdrawn, and when of a uniform color the timing is begun. Only boxes of the same size or same width should be used at one time.

PROCEDURE

The simplest method of case hardening is as follows: After forging or machining.—1. Carbon at a temperature between 1600 and 1750 deg. (1700 desired.) 2. Quench. The above method has been used in the past to a very considerable extent but is now being replaced by one more elaborate. The high temperature at which the piece is quenched in this treatment leaves a coarse granular structure, which is not satisfactory and does not possess the requisite toughness for the majority of work.

The method used to a very considerable extent is as follows: After forging or machining.—1. Carbonize at a temperature between 1600 and 1750 deg. (1700 desired.) 2. Cool slowly in the carbonizing compound. 3. Reheat to 1500 to 1550 deg. F. and quench. This method, called the single reheating method, refines the grain of the interior and makes the exterior exceedingly hard. This gives a

tough structure and for all ordinary parts may answer the purpose.

Another class of work demands the best treatment—such work as gears, etc.—and the following heat treatment is suggested: After forging or machining.—1. Carbonize at a temperature between 1600 and 1750 deg. (1700 desired.) 2. Cool slowly in the carbonizing compound. 3. Reheat to 1500 to 1550 deg. F. 4. Quench in oil. 5. Reheat to 1400 to 1450 deg. F. 6. Quench in water. 7. Draw in hot oil at a temperature from 300 to 450 deg. F., depending upon the degree of hardness required.

This method refines and strengthens the interior, the uncarbonized part, and refines the exterior, the carbonized part. The last operation may be dispensed with, but for work requiring this special treatment, and to be exceedingly tough, both interior and case, it is desirable. It should be continued from one to three hours to insure the full benefit of the readjustment of the material to the particular heat condition and the relieving of all internal strains. In steel given this heat treatment the exterior will show a very fine structure, and the interior will probably show a silky, fibrous structure.

The above will give largely the variations in case-hardening operations that will apply to a large number of cases.

Heating in Lead

Heating in lead is used extensively where only a slight variation in temperature is permissible. There are a number of unsatisfactory conditions, including: (1) the density of the lead and the necessity of holding the pieces in the lead by some mechanical means; (2) the purity of the lead. The lead should be as pure as possible and especially free from sulphur. Trouble is sometimes experienced by the lead sticking to the work. This can be avoided by dipping the articles in a solution of cyanide of potassium and water—about 1 lb. of the powdered cyanide to 1 gal. of boiling water. This should be used cold and the articles permitted to dry before putting them in the lead bath. The pieces should be left in the lead long enough to come to the temperature of the bath, but not permitted to remain in the lead longer than heating through. The pieces can be quenched in oil, water or brine as preferred.

Heating in Salt

There is a good deal of difference of opinion regarding the method of heating in salt for hardening purposes. Barium chloride has been used quite extensively, and seems to work perfectly clean at first; but after having been used for some time it begins to pit the steel, which is probably due to the oxide dissolved in the metal salts. If the barium chloride is replaced it then works satisfactorily again. As long as this constant replacement goes on good results are obtained.

There are other salts that seem to give satisfactory results. One of the large steel plants uses a mixture of calcium chloride and sodium chloride; about three parts of the former to one part of the latter. This combination melts at about 900 deg. F. and so is low enough to prevent the cooling effect of the steel from solidifying the bath. One advantage of the salt bath is that no bad results come from the material of the bath adhering to the object. When the latter is quenched the salt is solidified and cracks off.

Drawing Temper

The most satisfactory way of drawing temper is doubtless the oil bath. A heavy viscous oil is used, of a high flash point, from 600 to 700 deg. F. This can be maintained at a uniform temperature by the aid of a thermometer. The pieces should be permitted to remain in the oil until thoroughly heated. Excellent results are obtained by leaving the pieces in the oil some time, which seems to relieve the quenching strains. This, of course, is an expensive method of drawing, but for small work is, doubtless, preferable to any other.

Drawing on a hot plate is a very satisfactory way, especially for dies and large tools. In this case the heated plate is usually kept much above the temperature to which it is desired to draw, and the extent of the drawing is observed by the temperature color.

The sand bath has been a means of drawing tools and other small parts for some time past. This has been only

partly satisfactory, so is being replaced in small tool plants largely by the oil bath, which gives much greater uniformity in the work. If heat colors are desired in the finished article they can only be obtained by tempering in air.

A New Virginia Blast Furnace

The Oriskany Ore & Iron Corporation, Buena Vista, Va., which on November 1 gave up to the Alleghany Ore & Iron Company the latter's Buena Vista blast furnace, on expiration of the lease, will build a furnace at Lynchburg, Va. The negotiations which have been pending for some time were closed in the past week. There has been active co-operation in the project by Lynchburg interests, and among the inducements given for the location of the furnace are a free site of 70 to 80 acres, furnished by the Lynchburg Traction & Light Company, and a cash subscription of \$25,000, of which \$20,000 is made by the traction company and \$5,000 by the Lynchburg Chamber of Commerce. The Oriskany Ore & Iron Corporation, of which R. L. Parrish is president and W. W. Taylor vice-president and general manager, agrees to build within two years a blast furnace of 125 tons daily capacity. It is stated that the plant will be along the general lines of the Buena Vista furnace, which is 70 x 16 ft., and equipped with four stoves. Contracts will be let at once and construction work will proceed as rapidly as possible, with the expectation of completing the furnace within a year. A plant will also be built for nodulizing iron ore and this will probably be ready by July 1, 1912. The Oriskany company has contracted with four independent fertilizer companies at Charleston, S. C., to deliver to it about 100 tons a day of "blue billy," the by-product from the treatment of Spanish pyrites. The Barr Ore & Iron Company, the stock of which is owned by the Oriskany Ore & Iron Corporation, has a brown hematite iron ore property at Pittsville, Va., from which 250 tons a day will be shipped to the Lynchburg furnace, a distance of about 40 miles. Located near the hematite ores, the Barr Ore & Iron Company also has a deposit of magnetite. This will not be drawn upon for the present as the contract with the Charleston fertilizer companies for blue billy extends over a period of years. The company's railroad connections will permit it to use either Pocahontas or New River coke.

The new furnace site is a level tract of land on the James River, three miles from the center of Lynchburg. There is direct connection with the Chesapeake & Ohio Railroad, and arrangements have been made by which a switching charge applies within a three-mile radius; under this the furnace company can ship also over the Southern and the Norfolk & Western roads. The product of the new furnace will be foundry and basic pig iron.

William B. Phillips, director of the University Bureau of Economic Geology and Technology, Austin, Texas, states that in Clay County is the largest natural gas field now known in Texas, supplying the cities and towns of Fort Worth, Dallas, Wichita Falls, Henrietta, Byers, Petrolia, Bellevue, Bowie, Sunset, Alvord, Decatur, Bridgeport, Rome, Irving, etc. About the first of this year the Lone Star Gas Company, Fort Worth, had in operation a total of 196 miles of 2 to 16-in. pipe. Since that time the service has been extended, and it is likely that further additions will be made. The gas is of excellent quality. It is likely that the cheapest natural gas in the world can now be obtained at Wichita Falls, as it is stated that it will be supplied to responsible manufacturing establishments at 1½ cents per 1000 cu. ft. This flourishing town has had 6 and 7-cent gas for some time, but the reduction to 1½ cents breaks all known records.

The Cincinnati Bickford Tool Company, Oakley, Cincinnati, Ohio, exhibited three Cincinnati upright drilling and tapping machines and one Cincinnati Bickford radial drill at the Turin Exposition, Turin, Italy, and has just been notified that the jury of awards has given the company the Grand Prix.

Iron and Steel Roofing Sheets*

The Methods of Coating and the Advantages of the Metallic Base—The Question of Durability

BY D. M. BUCK†

This paper will be confined mainly to the discussion of those forms of roofing made from steel or iron, rolled into sheets in the usual manner, annealed to give the proper softness and ductility and coated with various substances for the purpose of excluding air and moisture from the underlying base metal of the sheet.

Painted and Galvanized Sheets

The three most important classes under this main heading are painted black sheets, galvanized sheets and terne plate. The first-mentioned, as the name indicates, is a black sheet of steel without any metallic protective coating, but covered with a coating of a good grade of paint before leaving the mill.

Galvanized sheets are made by passing the black sheets, after the surfaces have been thoroughly cleaned and prepared, through pure molten zinc. By this process the surfaces are uniformly covered with an adherent coating of zinc, which entirely excludes the oxygen and moisture of the atmosphere; and inasmuch as the solution pressure, in other words the corrodibility, of zinc is very low, the life of such a sheet under weather conditions, even without being painted, is remarkably long. In addition to the direct exclusion of the elements, zinc has another property which makes it an excellent protective medium for iron and steel. I refer to the well-known fact that zinc is electropositive to iron or steel, and wherever the two metals are exposed together the difference of potential tends to protect the iron or steel at the expense of the zinc. This is easily illustrated by shearing off the covered edge of a galvanized sheet and exposing the raw edge to the weather. After months', or even years', time an examination of this raw edge will show that no corrosion whatever has taken place; and although the action of the zinc itself at the point of contact has been somewhat accelerated, yet the natural low corrodibility of zinc causes this action to be very slow. The ultimate life of a sheet where the underlying metal has been laid bare is, of course, less than that of one perfectly protected, yet the electrolytic protection mentioned will, as above indicated, preserve the metal for a considerable length of time.

Galvanized sheets, painted sheets and black sheets unpainted are furnished by the average manufacturer in nearly any gauge or size, plain or corrugated, or V-crimped, and also in the form of roll roofing, so that it is possible for a consumer to procure almost any form desired.

Terne Roofing Plates

Terne plate is made by passing thoroughly cleaned steel plates through molten terne mixture. This terne mixture is an alloy of pure tin and pure lead in varying proportions, the most common mixture being 27 per cent. tin and 73 per cent. lead. When plates emerge from the bath of molten metal they are thoroughly covered with a fairly uniform coating of this alloy. Since terne mixture itself is practically incorrodible one may expect long service from a roof formed of this material. Terne plates are furnished commonly in sheets 20 x 28 in., 112 sheets to the box, but as is the case with galvanized and black sheets it is also furnished in the form of roll roofing where the sheets are soldered on the ends and ready to roll out on the roof and fasten at the sides in one of the well-known methods of flat seam or standing seam construction.

Protecting Steel Sheets

Steel or iron is an excellent material for using as a base in the manufacture of roofing sheets, inasmuch as it has in itself nearly all of the properties required for

roofing material. It is strong, ductile, rigid, impermeable to rain, snow, storm or sun, and is fireproof. But it is corrodible and must be protected from the action of oxygen and moisture. This is true of all iron or steel, no matter what the composition or what name is given to the product. Any unprotected iron or steel, if exposed to the weather, will form a film of red rust on the surface after the first rain.

The engineer in constructing a tall office building employs in the framework the best material available for the purpose to give the strength, rigidity and carrying power necessary to sustain the building. This material is, of course, structural steel. But he also knows that this material must be protected from corrosion and he therefore covers it and protects it from the atmosphere with concrete, tile or some other of the well-known materials of construction.

So in the building up of a roofing sheet the basic structure of the sheet, i. e., iron or steel, is always covered either by the manufacturer or by the consumer with some film which will exclude air and moisture. It would be ridiculous to expose any iron or steel sheet to the weather without such protection.

Ability to Last

One sometimes hears the statement made that roofing sheets manufactured to-day do not "last" as long as those obtainable in former times. This impression is entirely erroneous and is no doubt explained by the fact that against the advice of honest manufacturers the tendency has been in recent years toward the use of lighter and lighter weight sheets, until to-day roofing of entirely insufficient weight has been substituted to an alarming extent for the heavier weights more suitable for permanent construction. This rather reprehensible practice can, no doubt, partially be attributed to the dishonest contractor, who has substituted lighter weight sheets than his employer had a right to expect. It is also partially due to a tendency on the part of the builder to secure an extremely low first cost.

In any case we wish to condemn this practice strongly and to go emphatically on record to the effect that sheets are made to-day by reputable manufacturers and are procurable on the market at least as good from point of actual service as any that have been manufactured in the past.

Owing to the widely varied forms in which sheet metal can be obtained, it is possible to construct from metallic sheets practically any type of roofing, from the flat or nearly flat construction to that of the steepest pitch.

Advantages in Construction

In the use of corrugated galvanized or black sheets the additional strength and rigidity imparted to the sheets by the corrugations make it possible to use this form without any underlying sheathing or roof construction except the purlins themselves, thus considerably reducing the ultimate cost of the roof and at the same time procuring by the use of proper gauges a roof fully as strong as other types requiring foundation sheathing for the roof surface material.

This same advantage is present to a greater or less extent in the use of flat or uncorrugated sheets of either galvanized or terne plate, since a practically continuous sheet formed by soldering and seaming presents a light, strong and more or less rigid construction capable of being applied to a skeleton frame and not requiring a solid wooden sheathing, as is necessary for most of the other forms of roofing construction.

As mentioned above sheet metal is impermeable to the weather and is not injured by hailstones, nor readily damaged by any falling body. On the soldered and seamed construction generally used on flat roofs there are no

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cracks for snow to sift through. Sheet metal roofs are absolutely incombustible and therefore fireproof.

Tin covered firedoors and shutters are the highest type recommended by the best authorities in the land, and metal roofs have recently been rated as the highest form of roofing by the National Fire Protection Association after years of experiments and tests with various other forms of roofing, including slate.

Comparisons

A metal roof properly laid also prevents the passage of flames from below and thus will, for a considerable time, retard the ferocity of a fire started from within. In the case of wooden shingles and slate a high wind often exerts force enough to strip the roof of its covering. This cannot take place on continuous metal roofs. Metal sheets will not curl up as is the case with wooden shingles and will not crack from impact or from the expansion and contraction due to changes in temperature.

Metal roofs are more easily applied and the first cost of installation is, therefore, considerably lower than that of any other type of permanent roof construction.

In the case of shingles and slate a leak, once started, is often very hard to locate and difficult to repair. This is also especially true in the case of the so-called "built up" roofs. In this type water often gets between the layers of felt and by the alternate freezing and thawing in the winter works itself to remarkable distances between the layers, causing blisters, and it is usually very difficult to trace and repair a leak in a roof of this character. A leak in a sheet metal roof is usually very easy to find and can be repaired at a very low cost in a very short time.

Metal sheet roofs are clean and sanitary, so that where necessary water from them can be collected into cisterns used for domestic purposes. Having no gravel and tar the surface is not so apt to clog up eave trough and conductor pipes as is often the case with so-called "slag" roofs.

The feature of the weight of a roof is often overlooked. This is an important advantage of tin roofs. For instance, 100 sq. ft. of I. C. tin laid with standing seam weighs about 65 lb., as compared with 400 lb. for wooden shingles, approximately 400 lb. for three-ply slag, 500 lb. for four-ply slag and 650 lb. for slate. Thus it can be readily seen that the lower cost due to lighter construction necessary in the framework for supporting walls necessary to bear a sheet metal roof must be taken into consideration.

Considering the subject from all standpoints we believe that metal sheets for roofs are not surpassed, if equaled, by any other form of construction, and we believe we are correct in saying that, considering either a temporary or permanent roof, the lowest cost per year of service can be had by the use of metal sheets.

The Accelerated Acid Test

Tests have been proposed and advocated by some manufacturers for the quick determination of the probable life of metal sheets in service. None of these have so far proved of any value whatever, but the one which has become most generally known is the accelerated acid test. This consists in exposing portions of a black sheet to 25 per cent. sulphuric acid and noting the relative loss of material in solution. In other words the test is based on the solubility of the material in sulphuric acid.

The writer has made many experiments which prove the utter fallacy of this test as a direct measure of corrosion, and nearly all of the investigators of this subject have come to the same conclusion. This resistance to the action of acid in certain products is obtained by the introduction of small amounts of copper into the molten steel, and if, for any reason, resistance to acid is desired or the consumer wishes to purchase on the basis of such resistance, material is furnished by the average manufacturer to-day which contains this small amount of copper and which will resist acid to an equal or greater extent than any of the widely exploited products.

It is absolutely necessary to paint the black sheet to protect it from the weather and it also affords additional protection of considerable value to coated sheets. The subject of the proper paint for a black or coated sheet is one well worthy a separate paper and will not be discussed by the writer at this time. Many tests are being made by eminent investigators along this line; much good has already come from their reports and more can be expected in the future.

Isthmian Canal Commission Bids

WASHINGTON, D. C., November 15, 1911.—Bids for material for chain fenders for all locks were opened yesterday at the Isthmian Canal Commission. The bidders were as follows:

Fawcett Machine Company, Pittsburgh, Pa.—Group 1, \$24,359. Item 1, \$2,172; 2, \$15,711; 3, \$1,935; 4, \$596; 5, \$3,402; 6, \$543. Group 2, \$437,526. Item 1 A, \$19,839; 1 B, \$18,261; 2 A, \$267,976; 2 B, \$26,091; 3 A, \$18,654; 3 B, \$8,713; 3 C, \$6,557; 4, \$9,576; 5 A, \$40,079; 5 B, \$12,458; 6, \$9,323. Grand total, \$461,885.

Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa.—Group 1, \$48,273. Item 1, \$4,647; 2, \$37,650; 3, \$2,170; 4, \$612; 5, \$2,598; 6, \$596.

Group 2, \$434,875.80. Item 1 A, \$29,375; 1 B, \$24,636; 2 A, \$268,921.80; 2 B, \$18,073; 3 A, \$21,790; 3 B, \$10,015; 3 C, \$7,550; 4, \$7,007; 5 A, \$32,360; 5 B, \$9,797; 6, \$5,361. Grand total, \$483,148.80.

Rosedale Foundry & Machine Company, Pittsburgh, Pa.—Group 1, \$26,213. Item 1, \$2,395; 2, \$16,980; 3, \$2,210; 4, \$5,060; 5, \$3,358; 6, \$710.

Group 2, \$470,914. Item 1 A, \$25,320; 1 B, \$23,106; 2 A, \$285,870; 2 B, \$19,254; 3 A, \$21,165; 3 B, \$9,830; 3 C, \$7,535; 4, \$8,124; 5 A, \$48,130; 5 B, \$14,640; 6, \$7,940. Grand total, \$497,127.

William Tod Company, Youngstown, Ohio—Group 1, \$37,800. Item 1, \$4,100; 2, \$24,000; 3, \$2,800; 4, \$1,200; 5, \$4,000; 6, \$1,700.

Group 2, \$782,000. Item 1 A, \$44,500; 1 B, \$43,000; 2 A, \$485,000; 2 B, \$33,200; 3 A, \$29,400; 3 B, \$13,800; 3 C, \$10,300; 4, \$26,600; 5 A, \$47,600; 5 B, \$14,800; 6, \$33,800. Grand total, \$819,800.

United Engineering & Foundry Company, Pittsburgh, Pa.—Group 1, \$21,113. Item 1, \$1,914; 2, \$12,916; 3, \$1,923; 4, \$609; 5, \$3,265; 6, \$486.

Group 2, \$406,892. Item 1 A, \$19,679; 1 B, \$18,030; 2 A, \$251,311; 2 B, \$17,827; 3 A, \$18,376; 3 B, \$8,528; 3 C, \$6,410; 4, \$9,970; 5 A, \$38,494; 5 B, \$11,950; 6, \$6,317. Grand total, \$428,005.

Otis Elevator Company, New York—Group 1, \$24,704.20. Item 1, \$2,399.66; 2, \$15,980.69; 3, \$2,190.40; 4, \$483.25; 5, \$3,164.97; 6, \$485.33.

Group 2, \$465,522.67. Item 1 A, \$26,526.40; 1 B, \$24,315.86; 2 A, \$281,612.58; 2 B, \$18,693.48; 3 A, \$18,667.33; 3 B, \$8,819.87; 3 C, \$6,684.38; 4, \$6,065.97; 5 A, \$51,142.83; 5 B, \$15,570.86; 6, \$7,423.11. Grand total, \$490,226.87.

Steady-Schmidt Mfg. Company, York, Pa.—Group 1, \$25,966. Item 1, \$2,370; 2, \$17,600; 3, \$2,775; 4, \$400; 5, \$2,456; 6, \$365.

Group 2, \$485,368. Item 1 A, \$23,550; 1 B, \$22,150; 2 A, \$310,800; 2 B, \$22,000; 3 A, \$25,500; 3 B, \$13,895; 3 C, \$9,200; 4, \$6,240; 5 A, \$34,800; 5 B, \$10,568; 6, \$6,665. Grand total, \$511,334.

Westinghouse Machine Company, Pittsburgh, Pa.—Group 1, \$30,499. Item 1, \$3,365; 2, \$20,245; 3, \$2,347; 4, \$528; 5, \$3,640; 6, \$374.

Group 2, \$514,026. Item 1 A, \$30,652; 1 B, \$28,098; 2 A, \$322,679; 2 B, \$21,957; 3 A, \$21,384; 3 B, \$8,910; 3 C, \$7,128; 4, \$9,229; 5 A, \$44,203; 5 B, \$13,813; 6, \$5,973. Grand total, \$544,525.

Wheeling Mold & Foundry Company, Wheeling, W. Va.—Group 1, \$30,730.79. Item 1, \$3,045.15; 2, \$20,175.38; 3, \$2,319.44; 4, \$918.02; 5, \$3,421.18; 6, \$851.64.

Group 2, \$573,417.37. Item 1 A, \$34,393.07; 1 B, \$31,528.64; 2 A, \$352,954.64; 2 B, \$26,654.87; 3 A, \$22,728.48; 3 B, \$10,553.40; 3 C, \$7,975.70; 4, \$16,685.55; 5 A, \$40,394; 5 B, \$12,545; 6, \$17,004.02. Grand total, \$604,148.16.

Bethlehem Steel Company, South Bethlehem, Pa.—Group 1, \$36,489.70. Item 1, \$4,522.30; 2, \$22,378.70; 3, \$3,613.50; 4, \$1,056; 5, \$4,125.20; 6, \$794.

Group 2, \$721,957. Item 1 A, \$47,613; 1 B, \$44,562; 2 A, \$424,433; 2 B, \$27,029; 3 A, \$38,418; 3 B, \$18,040; 3 C, \$13,519; 4, \$19,851; 5 A, \$58,300; 5 B, \$17,102; 6, \$13,090. Grand total, \$758,446.70.

Bids were opened by the commission to-day to furnish structural steel, steel rivets and reinforcing steel rods as follows:

Baltimore Bridge Company, Baltimore, Md.—Class 1, \$20,205.40, 75 to 105 days. Class 2, \$203.20, 75 days. Class 3, \$3,370.34, 45 days.

Belmont Iron Works, Philadelphia, Pa.—Class 1, \$20,261.07, 110 days. Class 2, \$286.50, 80 days. Class 3, \$3,316.80, 80 days.

Buffalo Steel Company, Tonawanda, N. Y.—Class 3, \$2,886.53.

Concrete Steel Company, New York—Class 3, \$2,821.44, 45 days.

Corrugated Bar Company, New York—Class 3, \$2,824.75, 45 days.

Des Moines Bridge & Iron Works, Pittsburgh, Pa.—Class 1, \$19,191.56, 80 to 120 days.

Oliver Iron & Steel Company, Pittsburgh, Pa.—Class 2, \$197.24, 30 days.

Lewis F. Shoemaker & Company, Philadelphia, Pa.—Class 1, \$22,706.16, 75 to 105 days. Class 2, \$245.45, 75 days. Class 3, \$3,584.48, 75 days.

United States Steel Products Company, New York—Class 1, \$14,791.67, 90 to 120 days. Class 2, \$163.57, 90 days. Class 3, \$2,833.24, 45 days.

J. B. Kendall Company, Washington, D. C.—Class 1, \$18,334.45, 50 to 75 days. Class 2, \$182.31, 50 days. Class 3, \$284.20, 50 days.

McClintic-Marshall Construction Company, Pittsburgh, Pa.—Class 1, \$19,005.22, 100 to 120 days. Class 2, \$185.44, 100 days. Class 3, \$3,477.34, 120 days.

Gear Hobber with New Drive

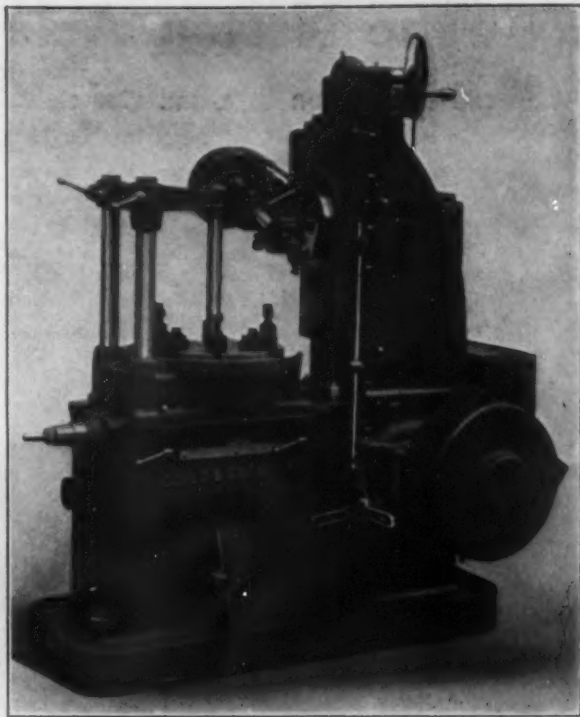
Speed Changes and Safety Features of Gould & Eberhardt Product

A number of improvements have been recently made in the line of high duty gear hobbing machines designed and manufactured by Gould & Eberhardt, Newark, N. J. These include a new single pulley drive with an adjustable guard to comply with the legislative enactments requiring all pulleys, gears, etc., to be guarded to prevent accident instead of the cone pulley drive formerly employed; the providing of ten speed changes for the machine, and an automatic stop or knockout which stops the entire mechanism of the machine when it has finished cutting a helical or spur gear.

Formerly it was necessary to reduce the speed of the cone pulley when using large diameter hobs as it was not possible to run them at as high a speed as the small diameter ones, and this reduction in the speed of the cone pulley decreased the power of the machine correspondingly when it was most needed with the large diameter hobs. The substitution of a single pulley drive gives the driving pulley a constant speed and the maximum power at all times. Another advantage of the single pulley drive is that it is not necessary for the operator to shift the belt to change the speed which it is pointed out is a difficult matter and one attended by some danger when the ceilings in a factory are exceptionally high.

The change gear mechanism provides ten speed changes in place of only four available with the cone pulley drive. These extra speed changes it is pointed out enable the operator to select the proper speed for the hob regardless of its size or the material from which it is made and the metal that it is cutting. It is thus possible to increase the speed of the machine when using small diameter hobs so that they will run at a greater number of revolutions per minute than hobs of larger diameter, and this can be done to increase the output of the machine without increasing the cut per tooth as the feed per revolution of the blank remains constant.

The automatic device for stopping the entire mechanism of the machine when a blank has been completely cut enables the operator to set the cutter slide trip dog in the proper position so that when the gear is finished the entire mechanism of the hobber will stop automatically with the exception of the driving pulley. This feature, it is emphasized, is important in cutting helical gears, as heretofore the operator has been compelled to watch his machine very closely until the gear was completed. It was then necessary to stop the machine by shifting the countershaft belt and this had to be watched closely so that the cutter slide would not continue to feed until it jammed into the revolving table. If to prevent this the feed to the cutter slide was thrown out before the hob had entirely cleared the blank being cut the former would mill the helical tooth away and thus spoil the gear. With this new arrangement if the feed is thrown out either by accident or otherwise before the gear is finished, the entire mechanism of the machine is stopped and no damage will be done. Other advantages of this arrangement are that the operator can feed up to a shoulder or line in cutting a helical or spur gear while the feed can be stopped automatically at the same point on every blank, thus making the work uniform, and by the use of this automatic stop it is possible for one man to



An Improved Type of Fully Automatic Hobber for All Kinds of Gears Built by Gould & Eberhardt, Newark, N. J.

operate more machines than could be previously taken care of.

An adjustable guard has been placed over the single pulley drive to comply with the laws recently enacted requiring all gears, pulleys, etc., to be guarded to prevent accident. The guard can be easily adjusted to the proper angle of the belt. All of the running gears are also inclosed with guards.

The Fritz Medal Presented to Sir W. H. White

At the nineteenth annual dinner of the Society of Naval Architects and Marine Engineers, in the Waldorf-Astoria, New York, on the evening of November 17, Sir William H. White, former Chief Constructor of the British Navy, the designer of the *Mauretania*, received the John Fritz medal for notable achievement in naval architecture. Sir William is the seventh man to receive the medal in the nine years since it was founded. The venerable American iron and steel manufacturer, now 89 years old, in whose honor the medal was founded in 1902, was present. Onward Bates, of the John Fritz Medal Board of Award, presented the medal to Sir William on behalf of the board. He said:

"On August 12, 1902, our venerated friend, who honors us with his presence to-night, was 80 years old, and on that occasion his friends decided to commemorate that anniversary and his own great achievement with the creation of the John Fritz medal. A corporation was formed of 16 members, four from each of the great engineering societies of this country. That board has awarded the medal for 1911 to Sir William Henry White for notable work in naval architecture, and to-night his name is added to those of Lord Kelvin, George Westinghouse, Alexander Graham Bell, Thomas Alva Edison, Charles T. Porter and Alfred Noble."

In accepting the medal Sir William said: "This medal is founded to perpetuate the memory of a great engineer, a great and splendid gentleman, a man of such eminent ability and winning personality that we all want to call him our own. To you, Mr. Fritz, my old friend, I can only say that to all English-speaking engineers you will always be 'Uncle John.' To you, Mr. Fritz, weighted down with years, let me say that the memory of your friendship will abide with me as long as I live. We shall not forget 'Uncle John.'"

The evening closed with a reception to Mr. Fritz, during which the engineers present pressed forward to grasp his hand.

BRIDGES & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The Norton Axle Grinding Machine

A Special Production to Grind Complete Three Railroad Axles an Hour—The Results of Engineering Tests Under Practical Operation

The car axle grinding machine shown in the accompanying illustrations is designed by its builder, the Norton Grinding Company, Worcester, Mass., expressly to repair standard car axles and to grind new car axles of standard specifications. The machine is not suitable for other kinds of grinding, the intention being to simplify as far as possible the construction of the machine and to make it more profitable in its operation. The machine is a pioneer in a great field of usefulness.

Fig. 1 shows the machine with axle on centers, and also how the wheel is placed on or taken off the grinding wheel spindle by means of a hoist which is a part of the equipment. Fig. 2 shows the manner in which the axle is raised by means of compressed air for turning on the centers. Fig. 3 shows the axle being lowered into the saddles, following the turning on the centers. Fig. 4 is a photograph of the end of a car axle which has just been ground on the machine. Fig. 5 represents the condition of bearings which have been produced by three different methods: A—turning, filing and polishing; B—turning and roller burnishing; C—grinding with this machine.

The Operation of the Machine

The operation of the machine is as follows: After the crane has dropped the axle into the saddles provided for

ator turns the axle by hand on a ball bearing pivot, and, allowing the air to escape from the lifting spindle, the axle falls into the saddles, provided for that purpose, being automatically guided into correct position. Turning on the air which operates the footstock, the axle is again

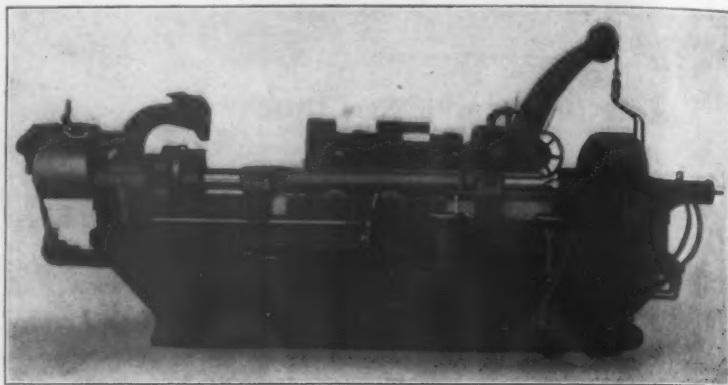


Fig. 1.—Axle on Centers; Hoist for Handling Grinding Wheel at Right.

lifted to the centers. The operator then clamps the driving dog in position and proceeds to grind the second end of the axle.

The machine is the outgrowth of suggestions by railroad men that if it were practicable to grind axles in commercial time with a modern grinding wheel there would be a large saving, due to the fact that when grinding it is necessary to remove only sufficient metal from the surface to make the axle round and true. When repairing axles by turning they rarely removed less than $1/16$ in. from the diameter, and more commonly $1/8$ in. This amount in most cases would be necessary to make the axle true and round by grinding. That being the case, it was reported by railway men that there would be a saving in axles which would amount to an enormous sum of money annually and would fully warrant a substantial, rigid machine of sufficient weight and quality to produce the best work with a minimum expenditure of time.

A Comparative Test

Referring to Fig. 5 attention is called by the builders to the fact that these samples have been rubbed parallel with the axes with bronze rings which are shown in the

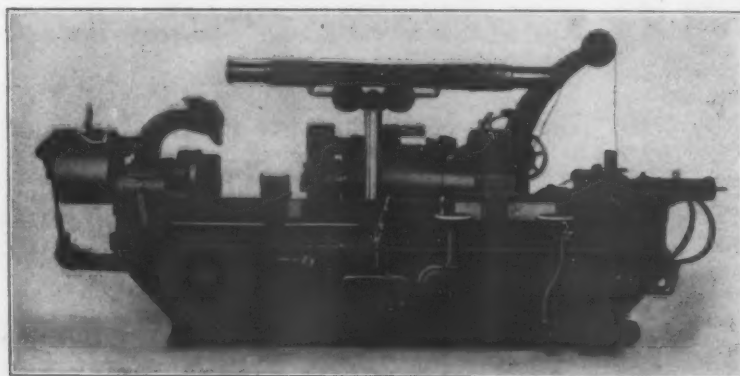


Fig. 2.—Axles Raised by Compressed Air and Ready for Turning.

that purpose, the locating of the axle for placing it on centers does not require further handling by the operator. He has simply to turn on the compressed air which lifts the axle onto the centers of the machine. The driving mechanism, which is of floating type, is then clamped to the end of the axle, allowing the axle to revolve on the two dead centers. The next operation is to clamp the footstock firmly to the table and proceed to grind. The location of the table or work as related to the wheel is obtained either by power or hand.

Two speeds are provided for power table traverse, a fast speed for quickly locating the work for grinding, and a slower speed which may be used when necessary for locating the work, also for truing the wheel with the special truing attachment. The wheel slide is brought forward with a hand wheel.

When the grinding is completed on one end of the axle the operator relieves the footstock clamp, releases the driving dog with a wrench, turns on the air which draws back the footstock, automatically removing the axle from both centers. By means of another air valve the axle is raised by a plunger as shown in Fig. 2, the oper-

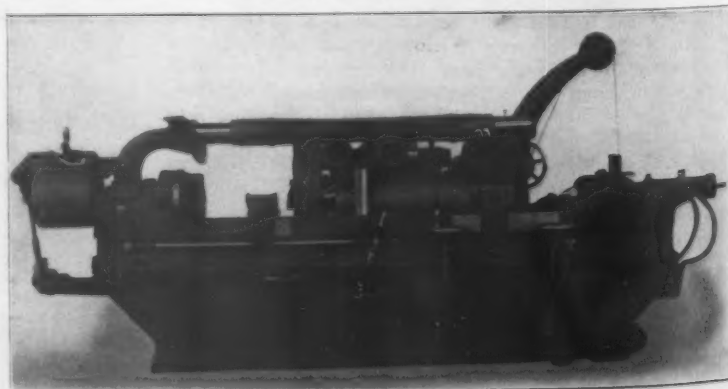


Fig. 3.—Axle Lowered Into the Saddles.

ator turns the axle by hand on a ball bearing pivot, and, allowing the air to escape from the lifting spindle, the axle falls into the saddles, provided for that purpose, being automatically guided into correct position. Turning on the air which operates the footstock, the axle is again

done without the use of abrasive material between the rings and the samples, the abrasion being caused wholly by the friction of the bronze metal on the steel. This method reveals the actual condition of the bearing, something which is impossible to observe when the bearing is simply ground, or turned and polished. It will be noted that the ground specimen shows practically perfect bearing over the entire surface. In other words, according to this exposition, practically every particle of steel touches the ideal ring, whereas the other two specimens show high and low places and they further show that such work has not only high and low rings, but that these high and low places are eccentric with each other and do not continue around the entire circumference. In other words they show that the film of oil between the box and a revolving journal made in this way cannot be uniform throughout the entire revolution, hence the tendency to heating when the journal is new must be greater than would be the case with the ground journal.

The designers also call attention to the point that with the ground surface, before the ring is rubbed upon it, there is a grain due to the grain of the grinding wheel. This, it is believed, will permit more perfect lubrication than would be the case with a burnished surface. If this lubrication is good when the journal is first put into use the journal will not heat, whereas with the other methods, as shown in the photograph, the high spots, coming around in an irregular, eccentric manner, must cut through the film of lubricant and cause heating. The photograph and explanation are included for the reason that a number of railway men when examining the ground journals have apparently been comparing them with some polished or mirror surface which they have seen on journals, and the company wishes to bring out the fact that ground journals, although they do not have a mirror surface, will give better results because they have a perfect cylindrical bearing where every particle of steel of the surface has exactly the same radius, thereby forming a perfect cylinder, the only qualification to this statement being the grain of the surface due to the grinding wheel; but even with this grain on the surface there are still many more particles of steel at the uniform radius than in the case of surfaces finished by the other methods. A journal with a mirror finish will not lubricate as well as will the perfect cylinder with grain surface. It is further maintained that the imperfections in the turned and polished, and the turned and roller burnished specimens are not uniform. They do not continue around the entire circumference. They are eccentric with each other and have various other imperfections which prevent any uniformity of bearing and therefore a uniform thickness of lubricant between the box and the journal is impossible.

The Results of Engineering Tests

Exhibit A shows the condition of the several shafts before grinding.

Exhibit B shows the time required for grinding the various elements of the shaft, also the horsepower used, as well as information regarding the grinding wheel.

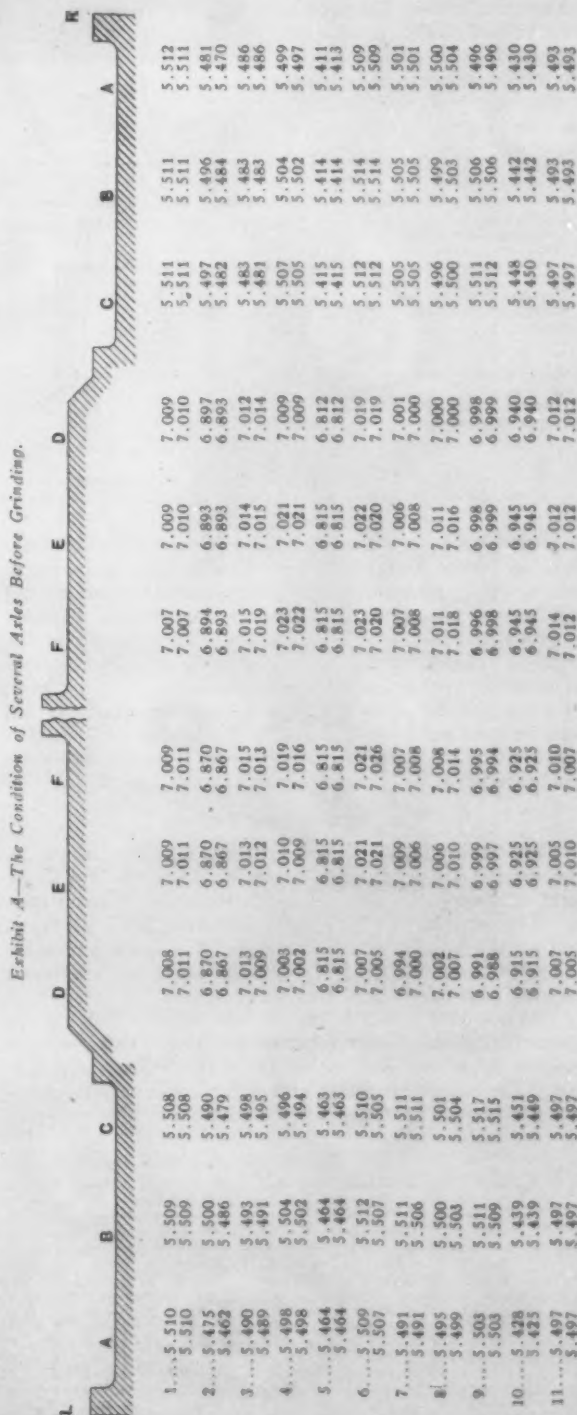
Exhibit C shows the average reduction of the diameters of the journals and wheel fits.

Referring to Exhibit A, the diagram is intended to represent an axle, A-B-C at the left hand end being the journal and D-E-F at the left hand end being the wheel fit. Thus F-E-D and C-B-A represent the same parts at the right hand end of the axle. Referring to the first line of figures, Axle No. 1, it will be noted that the journal was 5.510 at A, 5.509 at B and 5.508 at C. It will also be noted from the second row of figures that this axle was round at all three of these places. A further reference to the table, however, will show that many of the axles were very much out of round and that all parts of the journal were not concentric, due to the fact that one place on the journal in some cases was round and in other cases was not round.

By referring to Exhibit B a very good idea may be had of the horsepower which was consumed in the grinding of the several axles, also the time which was required for grinding the various elements of the shaft, including putting the work into the machine, turning the work on centers for grinding of the second end of the axle, and taking the axle out of the machine.

An analysis of Exhibit A, Exhibit C and Exhibit B

will explain the difference in time and amount of material removed from the different axles. For instance, on Axle No. 2 it will be seen from Exhibit A that the journal at the left hand end was 0.028 in. larger at one end than at the other, and was 0.014 in. out of round, while the journal at the right-hand end had a difference of 0.027 in. diameter and was 0.015 in. out of round. Referring to the same axle on Exhibit C, which shows the average rough diameter, we see that the reduction of diameter at the left-hand end was 0.030 in. and at the right-hand end was 0.021 in.; and from Exhibit B it will be seen that Axle



No. 2 required 33 min. and 25 sec. total time, while other axles which were more nearly uniform in diameter and more nearly concentric before grinding required less time and the amount of material removed was also less than in the case of Axle No. 2.

The centers in the axles used for these experiments were in very bad condition. The angle of the center hole was different on each and every axle and the holes were very much scored and out of round. It was necessary to ream out a portion of these holes so as to permit of grinding the journals, etc., cylindrical. This, as a matter of

course, changed the axis on which the axles revolved and made some apparent discrepancies in the figures obtained by measurement of the rough axles and the amount of material removed in obtaining the finished axle. Also the using of such imperfect centers would be quite liable to result in imperfect work. An examination of the axles after grinding showed that the ground axle was practically perfect as to roundness with slight errors in some cases where the centers were unusually bad. With good center holes the ground axle shows no imperfections that the micrometer will exhibit.

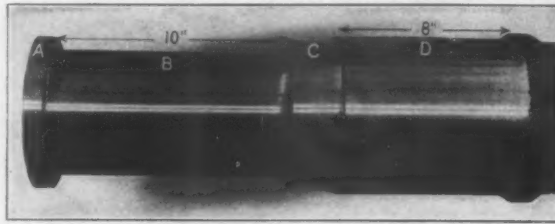


Fig. 4.—End of Axle After Grinding.

Exhibit B—Time Required for Grinding the Various Elements of the Axle

Axle number.	2	3	5	6	8	10	11
Time.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.	Min. Sec.
Putting in.	7-20	1-12	1-32	1-32	1-27	0-56	1-06
Grinding right hand.	(A) 0-45	0-34	1-14	0-18	1-03	0-37	0-28
End.	(B) 7-20	5-51	5-44	2-58	7-51	6-22	4-09
	(C) 1-45	1-30	2-22	0-42	1-34	1-55	1-08
	(D) 3-00	2-51	5-44	2-12	4-15	1-46	2-42
Turning work on centers.	1-25	1-48	1-32	1-25	1-17	0-48	1-22
Grinding left hand.	(A) 1-45	0-37	1-14	0-44	1-04	0-56	0-49
End.	(B) 7-15	3-30	8-02	5-07	7-58	8-05	5-53
	(C) 3-05	0-57	1-58	0-58	1-07	2-18	1-28
	(D) 4-00	2-14	3-52	3-11	4-03	2-56	3-32
Removing work from machine.	1-40	1-04	1-16	0-59	1-03	1-12	1-12
Total time.	33-25	22-08	27-14	20-16	32-42	27-41	23-49
Maximum horsepower.	42.0	29.1	40.1	29.2	34.0	32.0	35.4
Average horsepower.	17.1	11.9	16.3	11.5	17.1	13.5	12.75

Motor running light requires 3½ horsepower.

Motor and machine running light require 6.44 horsepower.

Wheel, 24 in. diameter, 9 in. face; speed of wheel, 1,036 r.p.m.; surface cutting speed, 6,500 ft. per min.

Referring again to exhibit B, giving the grinding times and the power consumed, the company calls attention to the fact that since the demonstration of October 18 and 19, further experiments have been made with a newly designed grinding wheel, and a material reduction in the grinding time, procured in fact so great a reduction that an average production of three complete axles an hour, all parts ground as in Fig. 4 can be guaranteed. It has been learned by these later experiments that still further improvement in time can be obtained if additional axles can be secured for further investigation.

The Machine Specifications

The total weight of the machine is about 23,000 lb. The weight of the grinding wheel head with its revolving parts, including the wheel and wheel guard, is about 5000 lb. The weight of the grinding wheel head gives an idea of the rigidity of the machine, this being necessary to secure smoothly finished journals under the maximum removal of stock with the grinding wheel.

The machine is motor driven, one motor supplying the power for all the elements of the machine. This motor is constant speed and may be of any make, voltage and current. The pump delivers about 50 gal. of water or lubricant per minute upon the wheel and work. This water or

and hardened. This bearing is calculated to make the machine very durable for railroad work, as there can be no wearing or wobbling of the driving gear under hard service. Some of the other details are as follows:

The gearing for driving the work is of special form, to give smooth, uniform action, and to prevent chattering of the surface of the ground axle. The centers of the machine are especially designed and there are no joints or tail slides to become worn and cause chatter on account of loose fits. They can never become loose, it is stated, even carelessly handled.

The main bearing on the wheel slide of this machine is 5 in. diameter and 12 in. in length. The spindle is of heat treated steel instead of the old-fashioned hardened spindle, to ensure the same hardness throughout. The driving belt is 8 in. in width and drives the spindle over a 12 in. diameter pulley for the slowest speed of the wheel. The wheel guard is made thick and heavy to prevent the possibility of accident in case of wheel breakage. All of the revolving parts in this machine are of high grade steel and where necessary are heat treated. The hand wheels and connections between the hand wheels and their work

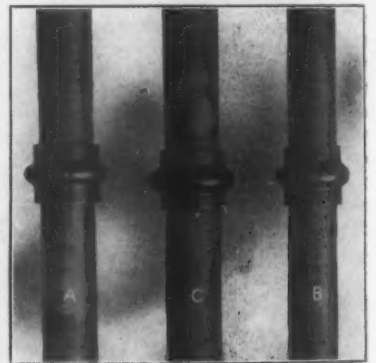


Fig. 5.—Condition of Bearings Produced by Three Different Methods.

Exhibit C—Average Reduction of Diameter, in Inches, on Journals and Wheel Fits.

No.	LEFT HAND END						RIGHT HAND END					
	JOURNAL			WHEEL FIT			JOURNAL			WHEEL FIT		
	Rough Diam.	Fin. Diam.	R'duct. Diam.	Rough Diam.	Fin. Diam.	R'duct. Diam.	Rough Diam.	Fin. Diam.	R'duct. Diam.	Rough Diam.	Fin. Diam.	R'duct. Diam.
2	5.482	5.452	0.030	6.869	6.846	0.023	5.485	5.464	0.021	6.893	6.880	0.013
3	5.493	5.488	.005	7.013	7.004	.009	5.484	5.466	.018	7.015	7.005	.010
5	5.464	5.446	.018	6.815	6.798	.017	5.414	5.400	.014	6.815	6.797	.018
6	5.508	5.493	.015	7.021	7.000	.021	5.513	5.506	.007	7.020	7.009	.011
8	5.500	5.482	.018	7.008	6.994	.014	5.500	5.487	.013	7.011	6.987	.024
10	5.438	5.409	.029	6.922	6.900	.022	5.442	5.422	.020	6.943	6.926	.017
11	5.497	5.476	.021	7.007	6.990	.017	5.494	5.483	.011	7.012	7.001	.011

lubricant is contained in a tank which is integral with the base of the machine.

The headstock and footstock are made heavy to absorb vibration. On the headstock is a gear box containing speed change gears for different revolutions of the work, and a lever for starting and stopping the work is conveniently located near the center of the machine. The work driving gear, which is of floating type, revolves on a roller bearing designed especially for this purpose, the parts for this roller bearing being carefully heat treated

and provided with ball bearings to make the action of the wheels smooth and easy. Where worm gearing is used it runs in an oil bath, and the spindle bearings and speed countershaft for driving the wheel are all self-oiling.

The Browning Engineering Company, Cleveland, Ohio, has recently taken several orders for locomotive cranes and reports that its plant is well filled with work. Its late orders also include a number for automatic buckets.

Cargo Transference at Steamship Terminals

H. McL. Harding, consulting engineer, in a paper on "Cargo Transference at Steamship Terminals," read before the Society of Naval Architects and Marine Engineers at its eighteenth general meeting in New York City last week, said that the attention of the railroad world has been so concentrated on the engineering problems arising between terminals that not until lately had been recognized the influence of the terminal on rapidity and economy of transportation. As an example of a realization of terminal needs he mentioned the \$3,000,000 freight terminal of the Missouri, Kansas & Texas Railroad at St. Louis, where mechanical methods instead of manual labor are depended upon.

Illustrations of cranes and carrying devices in use at Bromberg, Germany; Brussels and Antwerp, Belgium; Groningen, Holland, and the Pacific terminal of the Panama Canal were among those which accompanied Mr. Harding's paper. It was stated that most of the transferring machinery of the Continental ports, such as Hamburg and Antwerp, was ancient. While there are many electric cranes in use in the latter city, the author pointed out that hydraulic cranes are still being installed there instead of electric, the reason given being that hydraulic cranes had given good service and so were being used in later installations. Hydraulic cranes, Mr. Harding said, had never been recommended for American ports. He gave statistics to show the cost of mechanical freight transference at certain Atlantic port piers. The total loading cost per ton, including tiering, for 2,000 tons loaded in nine hours was \$0.13028, against \$0.366 by manual labor, while the total cost per ton of discharging 2000 tons in nine hours was \$0.14575, against \$0.3915 by manual labor.

A Good Record on Sulphurs.—The Robeson Iron Company, which started up its furnace at Robeson, Pa., October 12, gives the following data as to the sulphur content of the pig iron made in the last preceding campaign of its furnace, which ended with July 10, 1911. The company's product is low phosphorus pig iron:

	Gross tons.	Per cent.
Sulphur 0.020 and under.....	25,356	19.91
Sulphur 0.021 to 0.030.....	43,922	34.49
Sulphur 0.031 to 0.040.....	24,905	19.56
Sulphur 0.041 to 0.050.....	15,966	12.54
Sulphur 0.051 to 0.075.....	13,702	10.75
Sulphur 0.076 to 0.100.....	2,854	2.24
Sulphur 0.101 to 0.156.....	345	0.51
	127,345	100.00

The International Acheson Graphite Company, Niagara Falls, N. Y., has been awarded a grand prize by the Turin Exposition, Turin, Italy. The company has exhibited in all of the world's great expositions, and never yet has it been given other than the highest award. It is the only maker of graphite in the world, and this award continues the splendid recognition that is given to the advancement of science as represented by the processes operated in the wonderful plant of the International Acheson Graphite Company. It is additional testimony to the remarkable creative and inventive genius of Dr. Edward G. Acheson, who is shortly to return from a European tour.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has received an order from the Canadian Pacific Railroad for a \$500,000 coal handling plant to be erected at Fort William, Ont. The plant will include a bridge, two Hulett unloaders, coal conveyor cars and a trestle. Considerable electrical power equipment will also be required. An interesting fact in connection with this contract is that it is the first order that has been taken for Hulett unloaders for handling coal, as hitherto they have been used exclusively for handling ore.

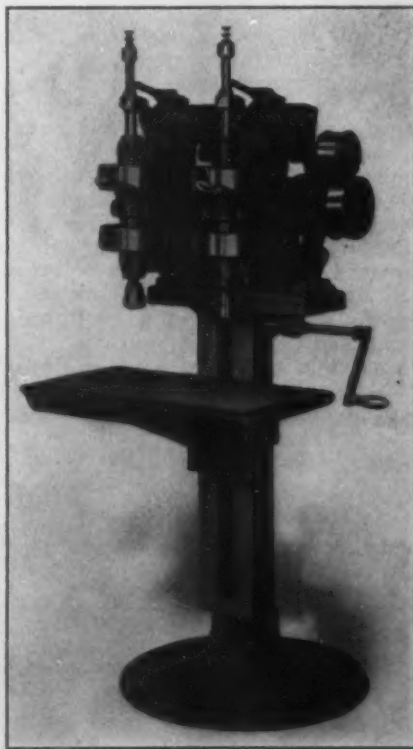
The Society of Automobile Engineers, whose headquarters are at 1451 Broadway, New York, now has nearly 1100 members. Among recent applicants for membership who were elected were Thomas A. Edison and George Westinghouse.

H. H. Hossman, Portsmouth, Ohio, has received the contract for all the iron and steel work for a practically new blast furnace for the Star Furnace Company, Jackson, Ohio.

Two-Head Automatic Tapper

A recent addition to the standard line of automatic tapping machines built by the Garvin Machine Company, Spring and Varick streets, New York City, is a new two-head machine which is known as the No. 1 two-head automatic tapping machine. The special advantages claimed for this new machine are that the capacity of a one-head machine is practically doubled, while at the same time it is possible to finish pieces having two holes of different sizes with one handling quickly since the machine works automatically, and when the tap is once started in the work it is not necessary for the operator to wait until the hole has been tapped before inserting a new piece in position, but he can be busy putting in a second piece for the other spindle to work upon, thus keeping both of them busy all the time.

The drive for this tapper is the same as that of the No. 2-A automatic machine which was illustrated in *The Iron Age*, August 24, 1911, each of the spindles being fitted with two friction pulleys driven in opposite directions by a continuous belt from an overhead countershaft while a friction



The No. 1 Two-Head Automatic Tapping Machine Built by the Garvin Machine Company, New York, N. Y.

clutch keyed to the spindle is located between the pulleys. This clutch is connected with the lever shown at the right of each head by a toggle arrangement which can be adjusted to give any desired tension, a construction which it is pointed out eliminates the necessity of employing an extra safety device to prevent the breaking of the taps. This hand lever starts the tap which is tripped and reversed automatically at any point by an adjustable screw stop on the upper end of the spindle coming in contact with the tripping lever on the top of the machine. The spindles are balanced and they are fitted with a positive drive chuck for holding the taps. The table, which is of ample proportions, is adjusted by a screw motion and has an oil groove around it to keep the lubricant from running over the floor.

The tap is started by the hand lever after which no further attention is required until the hole is finished, as the tool will go to the bottom of the hole and return automatically. The capacity of the machine is about 1/16 to 3/4 in. U. S. standard tap in cast iron or 1/16 to 1/4 in. in steel, the maximum depth of hole in both materials being 1 1/2 in.

The tin miners in the Federated Malay States are complaining of the 10 per cent. export duty on tin.

A Special Planer Drive

The Slow Speed Type Developed by the Cincinnati Planer Company

An adjustable-speed electric motor drive has been developed by the Cincinnati Planer Company, Cincinnati, Ohio, which has an additional slow speed arrangement that involves the use of gears. In general the drive does not differ very materially from that illustrated in *The Iron Age*, October 27, 1910, except for the incorporation of the slow speed mechanism. The slow speeds are intended to be used for machining very hard castings, such as chilled rolls, and also for work of irregular shape or having wide surfaces which are to be finished by a form tool at a slow speed. Fig. 1 shows a 36-in. planer equipped with the new drive, while Fig. 2 is a rear view of the tool showing more of the details.

An adjustable-speed motor having a variation of 2 to 1 is directly coupled to the top shaft and drives the planer. This shaft runs in ring-oiling bronze bushed bearings and carries the ordinary cutting and return pulleys which are keyed to the shaft. The cutting and return speeds are varied by moving the levers A and B on the controller, shown at the lower left corner of Fig. 1, to the position corresponding to any predetermined speed desired. The cutting speeds range from 27 to 54 ft. per minute, and return speeds of from 75 to 150 ft. per minute are available or any combination of these can be obtained.

Any cutting speed within the above limits can be obtained without altering that of the return, while the return speed can be varied without in any way affecting that of the cutting stroke. In this way it is possible to operate at a cutting speed of 27 ft. and a return of 150 ft. or at a cutting speed of 40 ft. with a return of 100 ft.; or, if desired, the return speed can be set at 100 ft. and only the cutting stroke varied. A limit switch in front of the housings operates the controlling levers so that once they have been set for any particular speed an automatic return to that speed at each stroke is secured. Changes in the speeds of the cutting and the return strokes can be made instantly while the machine is idle or running on either stroke.

The Slow Speed Mechanism

The special slow speed is obtained through the back gears on the top of the housing and the gear on the left

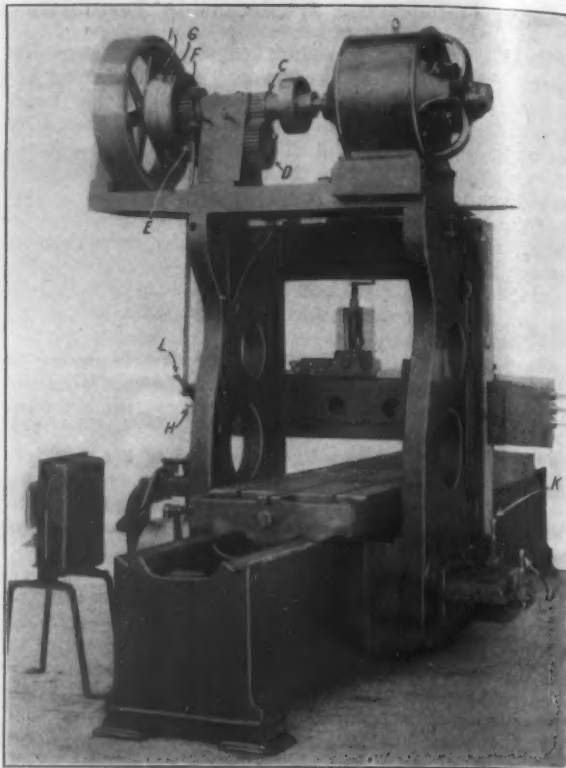


Fig. 2.—Rear View of the Planer Showing Details of the Drive.

housing. Referring to Fig. 2, the pinion C is keyed fast to the top shaft and meshes with the gear D that is keyed to the back gear shaft on which the pinion E is fastened. This second pinion meshes with the gear F which is tightly keyed to the hub of the pulley G that is loosely mounted on the top shaft. When the handle H, which is also shown in Fig. 1, is moved the cutting belt is shifted from the cutting pulley I, Fig. 2, to G, thus giving a slow speed to the pulley on the planer. A further speed reduction is made through the back gears to the regular gear train in the bed which gives cutting speeds of from 1.6 to 3.2 ft. per minute.

When it is desired to change the planer from the slow

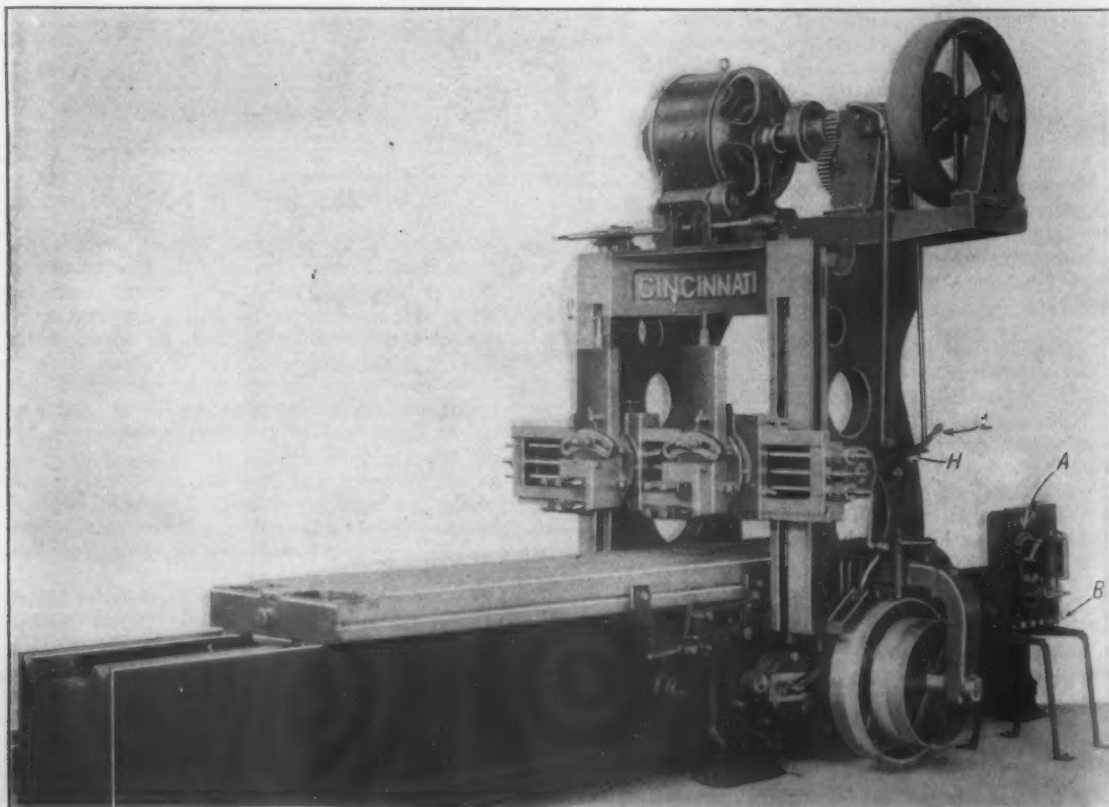


Fig. 1.—A 36-In. Planer Equipped with a Special Slow Speed Drive Designed by the Cincinnati Planer Company, Cincinnati, Ohio.

to the regular speed all that has to be done is to disengage the back gear handle J and reverse the clutch handle K. The cutting belt is then shifted from the pulley G to the regular cutting pulley I by moving the handle H. If it is desired to use the planer for any considerable length of time at the regular cutting and return speeds the back gears D and E can be disengaged by operating the handle L. In this way a very flexible arrangement is secured which gives cutting speeds of from 1.6 to 3.2 ft. or from 15 to 54 ft. per minute.

Multiple-Spindle Stay Bolt Drill

Machine for Removing the Cores of Boiler Bolts

In view of the recent recommendation of the Interstate Commerce Commission regarding the use of telltale holes in locomotive boiler stay bolts which allow steam to escape when the stay bolt breaks and thus give warning of danger, a recent product of the Foote-Burt Company, Cleveland, Ohio, is of particular interest to railroad and boiler shops at the present time. This machine, which is a four-spindle stay bolt drill is not, strictly speaking, a new machine, but is one that has been redesigned to make it a thoroughly up-to-date machine by improving the construction of the details and to provide for the increased strain caused by the use of high speed steel.

The machine has the capacity of four 5/16-in. drills and will accommodate stay bolts from 3/4 to 1 1/4 in. in diameter and ranging in length from 3 to 15 in. Each of the four spindles has three independent speeds and two changes of power feed, the latter being equipped with an automatic knock-off that can be set for any depth of hole

for each spindle. An automatic power feed is provided through a steel worm and a bronze worm gear. From the spindle power is transmitted through gears and a belt to the feed shaft which drives a worm gear that in turn drives the feed pinion shaft. The belt runs on two sheaves of different sizes and by shifting it from one sheave to the other the two changes in power feed are secured. A clutch on each spindle controls the engagement of the power feed while the lever feed is always in mesh. The automatic power feed knock-out consists of an adjustable collar on the upper end of the spindle sleeve which engages with a trip and stops the feed.

The table has a maximum vertical adjustment of 24 in. and is counterbalanced by a weight inside the column. A lever connected with an eccentric shaft clamps the table in the desired position. A vertical adjustment of 12 in. is provided for the spindles which are clamped by a lever operating an eccentric shaft. The spindles are of 0.35 per cent. carbon steel and are ground to fit. When the countershaft is running at a speed of 350 r.p.m., spindle speeds of 1,150, 630 and 370 r.p.m. are available.

The stay bolts are centered beneath each spindle and held rigidly in position by specially designed chucks having a simple quick-acting gripping mechanism. The drill runs in a hardened bushing which insures its starting in the center of the piece held in the chuck. These chucks can be readily removed, thus rendering the machine available for a variety of sensitive drillings.

The following table gives the principal dimensions and specifications of the drill:

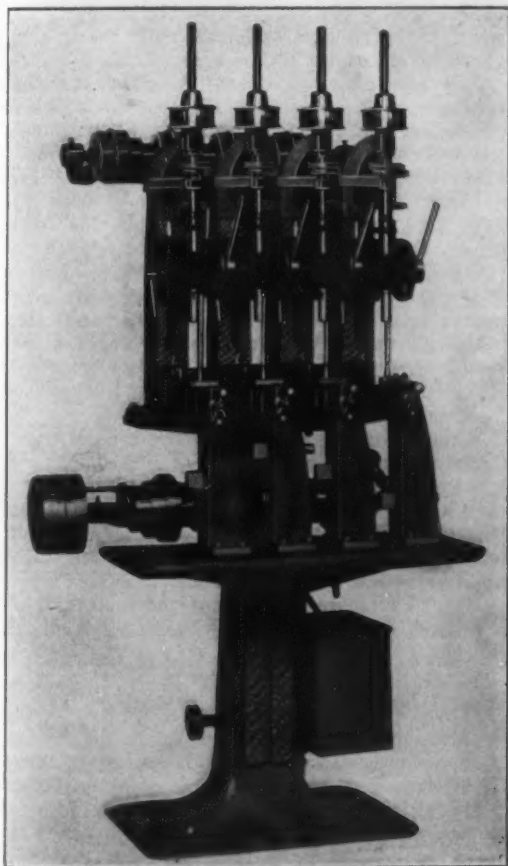
Distance between spindles and upright, in.....	7 1/2
Distance between spindle centers, in.....	6 1/2
Maximum distance between table and spindles, in....	36
Minimum distance between table and spindles, in.....	4
Length of power feed, in.....	3
Morse taper of hole in spindle.....	No. 1
Size of table, in.....	12x31
Weight, lb.....	1200

An oil pump and a return tank are included in the equipment of the machine so that liberal quantities of lubricant can be used. On account of the extremely rigid design of the machine and its ease of operation it is claimed that a boy can keep the four spindles running at their maximum capacity, thus reducing the piece cost to a minimum.

Motor Wagon Display in New York

Business men engaged in all lines of industry and trade requiring much haulage and delivery of goods or materials will be able to make a study of motor trucks and delivery wagons in New York next January. From the 10th to the 17th of the month there will be gathered together in the Grand Central Palace the most improved models of these machines produced by 35 or more manufacturers. Many of the makes are wholly new to the general public, while most of the companies that have made displays before have added new models to their lines. The machines to be exhibited cover the widest possible range in type of vehicle, load capacity and selling price. The show is to be conducted under the auspices of the National Association of Automobile Manufacturers by S. A. Miles, who has managed the annual automobile shows held in Chicago since 1900. As the Grand Central Palace Show is to be held concurrently with the annual motor car exhibition in Madison Square Garden, non-resident visitors who attend either exhibition will be able to see the other without making a second trip to New York. The same manufacturers will not have displays at both shows, and consequently during automobile show week it will be possible to inspect 200 or more of the newest and best models of commercial cars built by 70 different companies.

The council of the Iron and Steel Institute has unanimously elected Arthur Cooper of Middlesbrough, England, to succeed the Duke of Devonshire as president of the institute in May next. The presidency is held for two years, the duke having been elected in 1909, in succession to Sir Hugh Bell. Mr. Cooper was elected a member of the institute in 1874, was appointed on the council in 1894, and became a vice-president in 1906. In 1892 he was awarded the Bessemer gold medal for his services to the metallurgy of iron and steel. He is the managing director of the North-Eastern Steel Company, Ltd., and is also a director of Dorman, Long & Co., Ltd., Middlesbrough.



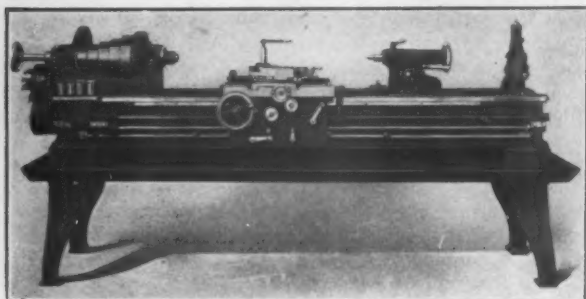
A New Type of Four-Spindle Stay Bolt Drill Built by the Foote-Burt Company, Cleveland, Ohio.

within the capacity of the machine. Both the feed and the speed can be changed quickly on any spindle without changing those on any of the other three. Each spindle has a large driving pulley, the power being transmitted from a self-contained auxiliary countershaft. Three-step driving cone pulleys on the main countershaft and corresponding ones on the auxiliary countershaft give the three speeds, there being a separate driving cone pulley

Relieving Device Integral with Lathe

Notable Development of the Hamilton Machine Tool Company

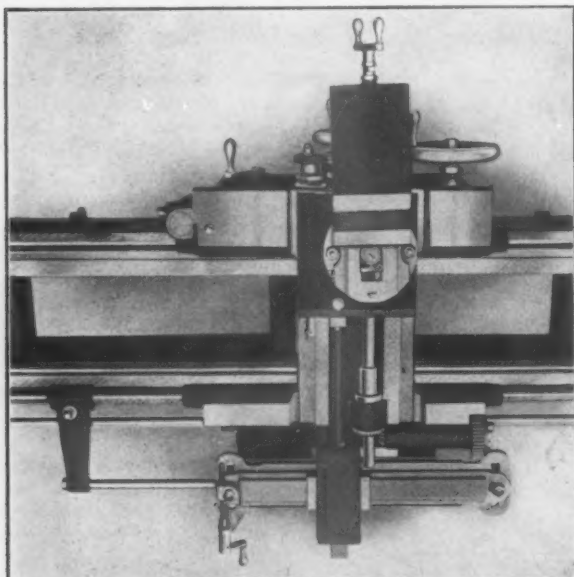
A new relieving device that is built into and is a part of the lathe itself is a recently developed feature of the 14-in. and 16-in. tool room lathes manufactured by the Hamilton Machine Tool Company, Hamilton, Ohio. The



The Hamilton Relieving Lathe.

drive for the relieving mechanism is from the back gears through change gears to a splined shaft which extends the full length of the bed. Driven from this shaft and sliding along with the carriage is a spur gear which transmits the power to a second gear that is adjustable on a sleeve and drives a pair of bevel gears as shown. This mechanism also drives the shaft at right angles to the first shaft and parallel to the bridge of the carriage.

Driven from this shaft and journaled in the carriage slide and swivel is a second pair of bevel gears, the vertical one carrying the relieving cam which transmits the in-and-out motion through the cam links adjustable box slide and heavy adjustable spiral spring to the compound rest tool slide. Three cams of double, triple and quadruple throw are furnished with each machine, and these with the different combinations of change gears enable the machines to relieve tools having from two to sixteen flutes inclusive. Changing the amount of throw from $1/32$ to $5/16$ of an inch to suit any particular work is ac-



Relieving Device Forming an Integral Part of the Lathe.

complished by turning a screw on the outside of the swivel which regulates the position of the adjusting block on the cam link. The "kicking off" of the tool at the right time is accomplished by adjusting the spur gear on its sleeve to the proper position.

As the drive is through the center of the swivel the machine will relieve all straight, angular and face mills up to 10 in. in diameter. The work of the new Hamilton relieving lathe is not confined to outside relieving only, but will do inside work as well, such as hollow mills and spring screw threading dies, doing it, it is explained, as rapidly and as accurately as a machine built solely for that purpose.

A Travel Recorder for Vehicles

A tamper-proof instrument to record the movement of vehicles, showing the time and duration of travel and stops, has been brought out for use on commercial vehicles by the Service Recorder Company, Cleveland, Ohio. The device is said to work equally well on heavy or light vehicles, either horse-drawn or motor-driven, and it is believed that a device of this character will have a large field among the users of commercial vehicles where it is desired to obtain records for various purposes, such as those effecting economical management and in computing the cost of cartage and making special deliveries.

The device consists of a specially designed timing mechanism having a movement similar to that of a clock and a recording mechanism operating on the pendulum principle. A steel stylus records the travel of the vehicle upon a printed chart that is revolved constantly by the clock mechanism and which is graduated for the 24 hours of the day and night, the smallest graduations on the chart representing 5 min. The whole device is inclosed in a round brass case 7 in. in diameter and $2\frac{1}{2}$ in. thick.

The recorder is a simple and substantial device which it is claimed is both reliable and not apt to get out of order. There are no flexible shafts or outside gears or connections of any kind and the device can be attached to a vehicle or detached in less than a minute, although this cannot be done without access to the interior, which is under lock and key. In setting the recorder the paper chart is inserted against a metal disk attached to the drum of the timing mechanism and placed so that the time at which it is being set will be shown on the chart by a pointer extending from the case. This chart is held in place against the disk by a circular plate having a simple catch.

The disk makes one complete revolution every 24 hr. and when the pendulum oscillates with the movement of the vehicle the stylus makes a series of distinct lines about $\frac{1}{4}$ in. long near the edge of the chart; the location of these lines showing the exact time that the vehicle is in motion. When the vehicle is moving the lines run so closely together that they make a solid line $\frac{1}{4}$ in. wide and when the motion stops only a light circular line is made on the chart. A special blue paper with a white opaque coating is used for the chart so that while the stylus is pressing on the back of the sheet its motion is very clearly marked by lines on the record side. If it is desired to consult the chart at any time this can be easily done by opening the door of the case and the chart can also be changed at any time. As an additional safeguard against interference with the record by unauthorized persons the dial of the chart is automatically punched to show the time the case is opened or closed.

When the records are removed they can be filed for future reference, and among the uses to which this recorder can be put are to show when a vehicle starts in the morning, when it is put up at night, how much time is taken at noon, the time and duration of delays at loading stations and shipping points, the time consumed in going between any two given points, the time of actual service of a vehicle for the day, to measure the efficiency of the motor truck and as a check on the amount of overtime earned by the drivers.

The Youngstown Sashweight & Foundry Company, Youngstown, Ohio, has completed its plant for the manufacture of sashweights exclusively. It is claimed that this plant is the largest of any in the country for manufacturing its special line. Methods have been so perfected that the company can successfully and economically melt cheap scrap of all kinds, such as tin cans, old galvanized roofing, cinder metal, etc. The capacity is 50 tons per day on a single turn of eight hours. Inquiries have been so heavy that the plant is expected to be placed on double turn the coming week.

The great Corliss engine, the power feature at the Centennial Exposition in Philadelphia in 1876, afterward removed to the Pullman Company's plant at Pullman, Ill., was sold October 5 to the Oakdale Iron Company, Chicago, for scrap. This engine, although rated at only 1400 hp., weighed over 650 tons.

The Machinery Markets

All sections do not report the same activity in the machinery market, but the reports when balanced show a fairly satisfactory condition. Large dealers in New York describe business as "spotty," or good here and poor elsewhere. Others said they were doing well. Contracts have been awarded for machine tools to equip the Newark East Side Commercial and Manual Training School. One or two lists of fair size are pending in New York. More activity in inquiries for hoisting machinery is reported in New York. In Chicago an increase in trade is observed, some fairly good orders for machine tools having been booked, with inquiries for single tools from the railroads. Detroit reports that small buying is active, with the demand from the automobile trade good. Cleveland conditions have improved with increased local business and inquiries are more plentiful. An order for handling and conveying machinery, amounting to \$500,000, has been placed in Cleveland by the Canadian Pacific Railway. An improvement in inquiries for wood working and electric equipment is noted in Cincinnati. Business in Philadelphia also is described as "spotty," although hope is held out that the increased buying of rolling stock by the railroads will soon be felt. New England is fairly active, although without big business. In the South the buying is for present needs. Requirements of small concerns continue to hold the attention of trade in St. Louis, but the aggregate amount of business is encouraging. Texas reports that manufacturing enterprises are busy and calling for some equipment. In Mexico political troubles have given the trade a setback. On the Pacific coast some slight improvement is noted, but no substantial betterment is expected before the new year. The export trade is fairly good.

New York

NEW YORK, November 22, 1911.

What change there is in the New York machinery market is conceded to be for the better. Although inquiries are scattered and call for one, or at best a few tools, it is conceded that the month so far compares favorably with preceding ones. Contracts have been closed for the machine tools required by the Newark East Side Commercial and Manual Training School. This business has been pending since early in the summer when the bids were opened. One New York firm gets an order for 12 lathes and some miscellaneous tools for the Newark school. The Lehigh Coal & Navigation Company, Lansford, Pa., whose list, recently out, represents about \$20,000, has not placed the business up to date, nor is there any development so far as could be learned with the requirements of the New York, New Haven & Hartford Railroad. Increased activity was shown during the week in hoisting machinery, there being several inquiries for apparatus of this kind from private sources. The inquiries are of a kind which are taken to indicate a healthier feeling in the trade. Exports are fairly satisfactory.

H. V. Lewis and Arthur H. Valiquette are actively engaged in the conduct of the H. V. Lewis Company, 30 Church street, which was organized recently and represents as direct sales agent a few well-known manufacturers of machine tools in the New York and Philadelphia territory. The company will represent the Prentice Brothers Company, Worcester, Mass., maker of drilling machines and engine lathes; Kemp-Smith Mfg. Company, Milwaukee, Wis., milling machines, and Newark Gear Cutting Machine Company, gear cutters and shapers. The officers of the new company are: H. V. Lewis, president; George C. Hughes, vice-president and Arthur H. Valiquette, secretary and treasurer.

The Turner Construction Company, 11 Broadway, New York, has received the general contract to erect a six-story reinforced concrete factory building, 62 x 63 ft., and a one-story power house, 50 x 100 ft., for the Barnet Leather Company, Little Falls, N. Y. The machinery details have not been announced, but it is understood much in the way of power and leather making machinery will be required.

The Hassell-Coe Construction Company has been incorporated with \$50,000 capital stock to manufacture rock breaking machinery. The incorporators are A. W. Hassell, Edward Coe and William T. Crisswell, 150 Nassau street.

The Robert Reiner Importing Company, Gregory avenue, Weehawken, N. J., has had plans prepared, and has awarded a contract to the Turner Construction Company, 11 Broadway, New York, for the construction of a two-story reinforced concrete building to replace its plant recently burnt. The company is importer and manufacturer of Swiss and German embroidery machinery. It is understood that much of the equipment will be of special design and imported, but some power equipment will be required.

The Sunset Company, 786 Broad street, Newark, N. J., has been incorporated with \$50,000 capital stock to manufacture dynamos, electric appliances, etc. The incorporators include C. D. Winter, Benjamin Glockfield, John Beckingham and Frank Rosenbaum, all of Newark.

The city of Plainfield, N. J., will open bids November 27 for the construction of a pumping plant and appurtenances, clay pipe sewer and cast iron pipe. J. T. MacMurray is city clerk.

The National Sand & Development Company, Peekskill, N. Y., is receiving bids for the installation of an excavating, crushing, screening and washing plant for handling sand and gravel to have a capacity of 1000 cu. yds. per day. Geo. H. Rice, Secretary, Peekskill.

The Meteor Automobile Company, Mount Vernon, N. Y., has been incorporated with a capital stock of \$50,000 to engage in the manufacture of motors, engines, motor vehicles, etc. F. A. Kateley, A. F. Gescheidt and L. Emmeluth, Mount Vernon, are the incorporators.

The Board of Contract and Supply, Albany, N. Y., is taking bids for furnishing three 15 kw. direct current turbo-generators for the water works system.

The C. J. Lundstrom Mfg. Company, Little Falls, N. Y., is completing arrangements for the erection of a five-story addition, 85 x 120 ft., to be made to its factory.

The Olney Packing Company, Medina, N. Y., will build and equip an addition to its packing plant on Olney street.

The Monitor Clock Works, Medina, N. Y., is having plans prepared for a factory which will have 30,000 sq. ft. of floor space.

J. H. Williams & Co., Brooklyn, N. Y., manufacturer of drop forgings, have purchased a site of 60 acres at the northerly city line of Buffalo, N. Y., on the Niagara Falls Division of the New York Central Railroad, and is completing arrangements for building an extensive manufacturing plant on the property.

The Pratt & Letchworth Company, Buffalo, N. Y., is building an additional steel foundry at its plant at Tonawanda street and the New York Central Railroad.

The Hoffman-Allen Company, Buffalo, is completing the equipment of its factory, and has already ordered a large boring mill, a milling machine and several lathes.

Fire destroyed the plants of Manzel Brothers, manufacturers of automobile oil pumps and of the Reliable Metal Stamping Company occupying a large building at Babcock street and the Pennsylvania Railroad, Buffalo. The loss on building and machinery was about \$80,000. Rebuilding operations will be commenced at once.

The Automatic Transportation Company, Buffalo, manufacturer of aerial transportation systems and portable loading and unloading apparatus for railroad freight stations, wharves and storage warehouses, is building an addition to its plant at Main street and the Erie Railroad.

The Buffalo Sled Company, North Tonawanda, N. Y., is building an addition to its plant on Schenk street, which will double its capacity. A warehouse is also being erected and the plant equipped with a sprinkler system.

The Niagara Chocolate Company, Niagara Falls, N. Y., will erect a large plant covering one acre of ground on Buffalo avenue. The main building will be 75 x 110 ft., two stories and basement, with wings 75 x 100 ft. Machinery of the most modern type will be installed, and the plant will be constructed to embody improved hygienic conditions including baths, rest rooms, etc. A large number of girls will be employed. Wm. H. Crosby of Buffalo is president and Ferd Plate, Niagara Falls, vice-president, treasurer and general manager. The company has a capital stock of \$200,000.

The Universal Road Machinery Company is constructing another manufacturing building at its plant at Kingston, N. Y., making the sixth factory building to be erected by the company since the establishment of its plant at Kingston.

Dunning & Glasser, 16 State street, Rochester, N. Y., were low bidders for the pumping station to be erected by the City of Rochester at Brighton Beach. F. X. Pifer is city secretary, Room 37 City Hall.

The Erie Pump & Engine Works, Erie, Pa., recently incorporated, will manufacture centrifugal pumps and steam engines, principally the former.

The Water Works Commission, Erie, Pa., will open bids December 6 for furnishing a 20,000,000-gal. pumping engine.

New England

BOSTON, MASS., November 21, 1911.

Conditions in the machinery market have experienced a change which is difficult to analyze. The week has been dull and on top of that an influence has been felt which is not encouraging to the dealers. Some of the machinery manufacturers have reduced production. Others may have taken on additional men; in a few cases such is the case. But as a whole the existing policy is toward retrenchment, because the accumulation of stocks has come nearer the limit of safe financial management. Men are talking politics, wondering what the future is to bring forth. The result is a waiting game, which for the time being is more strongly accentuated. Reports from the wire industry of New England indicate a falling off of business. Correspondents of the machinery people write from other parts of the country a similar experience.

As for stocks of machine tools they are by no means too large, relatively speaking. Were a business boom to start up it would be a matter of a few weeks only before deliveries would be creeping into the future, if one can accept the opinion of machinery dealers from various parts of the United States. Yet millions of dollars' worth of completed product are stocked in New England and at least an equal ratio may be apportioned to other territories. Certain types of machines are in better demand, but with most of the standard lines orders are less than production.

Seymour E. Hall has been made manager of the Rochester, N. Y., office of Hill, Clarke & Co., Inc., Boston. Mr. Hall had occupied the same office at Cleveland for Hill, Clarke & Co., Chicago.

The Taunton-New Bedford Copper Company, New Bedford, Mass., is purchasing a complete rolling mill equipment, engine, boilers and other equipment for the new mill building which was mentioned in *The Iron Age* of last week. The company does not care to give out requirements in detail. The building will be 125 x 375 ft. The company operates copper and yellow metal rolling mills and manufactures specialties, including pure copper nails and tacks, yellow metal sheathing, slating and boat bails and Hill electric switches.

The Remington Oil Engine Company, Stamford, Conn., manufacturer of stationary and marine oil engines, has brought out a modification of its product to operate on fuel oils, distillates, etc., having a density as low as 28 deg. Baume, flash test 150 deg., and 18,000 to 19,000 B.t.u. This engine brings the cost of fuel for power down to three cents an hour per B.hp. hour. The oil is injected into the combustion chamber as liquid, but the temperature is so arranged that atomization, vaporization and combustion of the oil takes place as much as possible in sequence, instead of simultaneously, which does away with a deposit of carbon on the cylinder wall. The company has had the best year in its history.

The Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., is to bring out a 15-in. high-speed sensitive drilling machine, equipped with ball bearings throughout, with the purpose of supplementing the new 14-in. machine by one of larger capacity.

The Crane Valve Company, Bridgeport, Conn., will erect a one-story building, 25 x 150 ft., which will be devoted to pattern storage.

W. & B. Douglas, Middletown, Conn., is putting on the market the Compact electric house pump, in which the reduction gear of the company's worm-driven triplex pump has been applied to a single cylinder, double-acting type, the result being a unit that is practically noiseless. It is designed for suction lifts of 25 ft. and a discharge head of 175 ft. or 75 lb. pressure.

W. W. & C. F. Tucker, Hartford, Conn., are adding new machinery for the manufacture of compression grease cups, which will be interchangeable.

The report is denied that the Columbia Motor Car Company will remove its works from Hartford, Conn., to the Middle West. The rumor arose out of the closing of the drafting department, and, possibly, because of the removal to Detroit of the Alden Sampson Mfg. Company, Pittsfield, Mass., which is also owned by the United States Motor Company.

Stockholders of the West Mystic Boat Company, West Mystic, Conn., which has been absorbed in the National Boat & Engine Company, are organizing a new company to carry on a similar business.

The Boston & Maine Railroad has authorized the expenditure of \$5,000,000 for the creation of a union passenger terminal at Portland, Me.

The United States Finishing Company, Pawtucket, R. I., will erect a power house 100 x 200 ft. of brick.

The Eastern Mfg. Company, South Brewer, Me., will enlarge its works by the erection of a large pulp mill. The company has contracted with the Bangor Railway & Electric Company for 3000 hp. in electric current, which will operate the entire plant.

Philadelphia

PHILADELPHIA, PA., November 21, 1911.

Here and there reports of a somewhat better volume of business are heard. Better conditions are, however, by no means general and no difficulty is experienced in finding both merchants and manufacturers who report continued dullness in the demand. In several instances, however, merchants have been able to close up a better proportion of the pending business and, while sales are still largely confined to single tools, occasional transactions covering several moderate sized tools as well as one small shop equipment are to be noted. While railroad buying, as far as machinery and tools are concerned, still continues very light, no fresh inquiry having developed, the trade is encouraged with the increased purchases made of rolling stock and motive power equipment, and anticipates a better development of general conditions. A slightly better inquiry for some classes of tools is reported, but mostly covering small general requirements. Machine tool builders report unchanged conditions; in some cases, however, builders of special equipment, while still fairly well occupied, note a decreased inquiry for that class of equipment. The demand for boilers and engines shows but little change; occasional orders are closed by both merchants and builders, but the equipment has been mostly confined to that of the smaller capacities.

An irregular demand for second-hand machine tools, machinery and general tool equipment is noted. The foundry trade continues to operate on an irregular basis. Gray iron casting plants, while probably increasing their melt, are by no means actively engaged, while steel casting plants operate on a basis varying from 35 to 60 per cent., largely on orders for comparatively early delivery.

The Hyde Park Mfg. Company, Bernharts, Pa., manufacturer of cotton bats, patent ball peen hammers, horseshoe calks and sleeves, ball-bearing washing machine frames, patent ball bearings, etc., established in 1908, has been incorporated with a capital stock of \$45,000. The officers are J. Wallace Miller, president and treasurer; J. H. Madeira, vice-president; Charles H. Madeira, secretary and sales manager. The company is erecting a two-story fireproof manufacturing building, but has not decided upon its requirements in the way of machinery and tool equipment.

The Philadelphia Department of Public Works, Bureau of Surveys, Harry A. Mackey, director, will take proposals until November 28 indorsed "Bids for

main sewer, branch sewers and Pennypack sewage disposal plant." Schedule A and B cover the sewer work, while Schedule C includes a frame disinfection house, a heating system and machinery supplies for the disposal plant.

A fire originating from locomotive sparks destroyed the office building and a large part of the shop of the Lehigh Valley Structural Steel Company, Allentown, Pa., last week. Very slight damage was done to the machinery or material in course of work. Plans for rebuilding are in progress, and meantime the company is operating the undamaged portion of the plant.

The Riverside Malleable Iron & Steel Works has been incorporated with a capital stock of \$150,000. G. B. Smallcomb and F. W. McKown, Pittston, Pa., are named as being among the incorporators.

Dienelt & Eisenhardt, Inc., are quite busy. Orders are in hand for a large amount of oilcloth making machinery, including printing machines for export to Russia. One large oilcloth printing machine has recently been delivered to G. W. Bird & Son, East Walpole, Mass. The demand for dead-stroke hammers, hydraulic jacks and pipe-expanding machinery has been rather inactive, although orders for considerable special equipment, particularly paper bag making machinery, have been very satisfactory.

The Department of Wharves, Docks and Ferries, Philadelphia, will receive bids until November 29 for the construction of a bulkhead on the Schuylkill River in front of Bartrams Park; \$50,000 is available for the work. Plans and specifications may be obtained on application to the director, Joseph F. Hasskarl, 555 Bourse Building, this city.

The Energy Elevator Company continues actively engaged in all departments. The demand for hand and power freight elevators has been well maintained and a very satisfactory volume of business, coming from various sections of the country, has been booked. During the coming summer this company anticipates plant extensions which will increase its productive capacity about 25 per cent.

The Easton Tool & Machine Company, 39-41 North Silgraves street, Easton, Pa., exclusive manufacturer of the Jackson line of vises, including the Utility drill press vise and the Turneasy line of blow-off cocks, has been incorporated with a capital stock of \$25,000. For the time being the company does not anticipate constructing a new plant, but will probably somewhat enlarge their present quarters. The officers of the new corporation are: C. L. Sonen, president; A. E. Dieffenderfer, vice-president; R. J. Lippey, treasurer, and C. J. Jackson, secretary and general manager.

Proposals are wanted by December 11 for constructing a complete sewerage disposal plant for Norristown, Pa. S. Cameron Corson is borough engineer.

Chicago

CHICAGO, ILL., November 21, 1911.

Sales of machine tools at Chicago and in the surrounding territory are reported as showing a very encouraging increase. A sale of tools including planer, lathe and milling machine, fully equipped and other small shop tools, aggregating \$5,000 in value, to a Two Rivers, Wis., concern is reported and also a similar sale amounting to \$2,200. Several other sales of radial drills, lathes and shapers are noted. The Chicago, Burlington & Quincy is reported to be in the market for two bolt cutters and the Illinois Central list remains unplaced. The increased volume of sales is not taken to indicate any change in the reluctance of buyers to install new equipment at this time, but is the result of enforced purchases of new tools. It is also anticipated that manufacturers are disposed to reserve their resources for investment in materials of manufacture rather than in equipment in view of the fact that material prices are certain to advance as business improves while machine-tool prices have been maintained at the level at which they may be bought at any time. In this connection it may be said however that buyers are now enforcing all of the incidental concessions possible and the margins in machinery sales, particularly of second-hand tools, are reduced to a minimum.

The Precision Lubricator & Mfg. Company has been incorporated, with a capital stock of \$21,000, by John S. Roberts, Emerson B. Stoddard and I. M. Adams.

The Stewart & Clark Mfg. Company has purchased property at Wolfram street and the Chicago & Northwestern Railway tracks. The buildings now occupying the site will be removed and a factory building erected.

The Electric Appliance Company, Chicago, has been organized with a capital stock of \$60,000 to handle elec-

trical apparatus. The incorporators are William W. Low, Thomas I. Stacey and William B. Walrath.

The Acme Automatic Tire Pump Company, Chicago, has been incorporated with a capital stock of \$50,000 to manufacture and deal in automatic pumps, automobiles, etc. The incorporators are Francis J. Carroll, Emil R. Rosenthal and Francis J. Houlihan.

The American Film Company, Chicago, has taken out permits for a one-story brick factory at 6227 Evans-ton avenue, to cost \$15,000.

The Adams & Elting Company, Chicago, paint manufacturer, to provide for the contemplated enlarging of its plant, has purchased a tract of land at Colorado and South Forty-fifth avenues.

The Brown Portable Elevator Company has let the contract for the construction of a \$10,000 factory building at North Chicago near Waukegan, Ill.

The M. H. Foundry Company, Belleville, Ill., has increased its capital from \$10,000 to \$50,000, and has purchased the buildings formerly occupied by the Belleville Tack Works, in which a general brass foundry will be operated.

The C. E. Bonner Mfg. Company, Champaign, Ill., contemplates the purchase of new equipment in the near future to keep pace with its greatly increased output.

The Rheinhardt Stove & Furnace Company, New Athens, Ill., has been organized with a capital stock of \$10,000 to manufacture furnaces and stoves and to engage in sheet-iron work. The incorporators are G. S. Rheinhardt, Henry Deichman and Peter Haupt.

At Fox Lake, Wis., a special election is to be held November 27 to authorize the issuance of bonds to the amount of \$20,000 for a new water-works plant.

The Beaver Dam Foundry, Beaver Dam, Wis., will add a core room of concrete construction to its plant, and for handling heavier work will install two new cranes over its foundry floor.

The Milwaukee School and College of Aviation is preparing plans for the building of a foundry and machine shop at West Allis, Wis. The company is a \$50,000 corporation.

The American Malted Food Company has arranged for the building of a factory at Waukesha, Wis., to cost \$20,000, for which new equipment will be required.

The Harder Auto Truck Company has been organized with a capital stock of \$100,000 to manufacture and deal in vehicles by Henry P. Chandler, J. M. Johnston and K. Cornwall.

Edw. F. Gales has taken out a permit in the amount of \$50,000 for the erection of a four-story brick factory at 232 North Morgan street.

The Williams-Anderson Machinery Company has been incorporated by J. H. Westover, John E. Waters and Eric Winters, with a capital stock of \$50,000, to do a general machinery, manufacturing and merchandising business.

The Western Mechanical Company will manufacture and deal in mechanical appliances. It has been organized by A. L. Williamson, M. J. Sullivan and K. C. Sawin with a capital stock of \$2,500.

The Chicago, Milwaukee & St. Paul Railway Company has taken out a permit providing for the construction of a machine shop at 2915 West Chicago avenue, to cost \$1,000.

The Avery Machine Company, Minneapolis, Minn., will soon begin the erection of a four-story steel-construction building, 130 x 150 ft., at a cost of \$100,000.

The Farm Power Machinery Company, Minneapolis, Minn., has been incorporated, with a capital stock of \$100,000, by H. L. Brockway, Walter Corey and R. C. Thompson.

The Glide Road Machine Company, Minneapolis, Minn., has had plans prepared for a two-story factory building, 76 x 90 ft., of brick construction, at an approximate cost of \$6,000. At present the company is not in the market for new equipment, but later will be in need of additional machinery for the manufacture of road-making machinery.

The Miller Machine Company, Bridgeport, Ill., recently mentioned as having been incorporated with \$6,000 capital stock, is in the market for one 26-in. Bridgford lathe, new or second hand, one 24-in. shaper, one 3-ft. radial drill press, one 12½ or 14-in. pipe machine, one emery wheel stand, one 25-hp. crude oil engine, a quantity of shafting, hangers, belting and pipe cutting supplies.

The Colby Motor Company, Nason City, Iowa, has had plans prepared for a new plant, one and two stories, 100 x 400 ft., of slow-burning mill construction, at an estimated cost of \$30,000. The company announces that a site has been procured, but building operations will not begin until spring.

Cleveland

CLEVELAND, OHIO, November 21, 1911.

The demand for machine tools has improved during the week. Dealers regard the general outlook encouraging and are more optimistic than they have been for some time. The largest order reported is from a local manufacturer, who bought seven tools, aggregating about \$4,000. Other sales have been mostly in single tools. Inquiries are more plentiful, there being several out for small lots of tools. The demand for second-hand machinery has improved, being now fairly active. In handling machinery a local builder has taken an order for a \$500,000 coal handling plant for the Canadian Pacific Railroad. Another local concern has an order from a Canadian steel company for a large ore handling plant. Some other inquiries for both ore and coal handling plants are pending.

The Chicago Pneumatic Tool Company has let a contract for a three-story addition to its present Cleveland plant. The extension will be 70 x 140 ft., of mill construction. Some new machinery equipment will probably be required. This plant is well filled with orders and for some time has been running at full capacity and overtime.

The Continental Sugar Company, Cleveland, is having plans prepared for a \$1,500,000 beet sugar plant to be erected near Ironville, Ohio, a suburb of Toledo. An 80-acre site has just been purchased. Several concrete and steel buildings will be required. J. F. Harper is president of the company and Fred T. Sholes, secretary-treasurer.

The Dunlap Mfg. Company, Columbus, Ohio, has been incorporated with a capital stock of \$50,000 by S. M. Dunlap, A. I. Schetenstein, T. C. Dunlap, L. F. Slater and B. G. Watson to take over the plant of the Dunlap Engineering Company, which was sold recently at receiver's sale to S. M. Dunlap. The new company will make pneumatic tools and automobile parts.

The Electric Sign & Scenic Company, Mansfield, Ohio, has been incorporated with \$5,000 capital stock by George H. Lowrey, E. P. Robbins and others to manufacture electric signs. For the present it will occupy quarters in the Holm Building on East Third street.

The Board of Commissioners of Stark County, Ohio, will receive bids at Canton, Ohio, December 15 for a Strauss trunnion bascule lift bridge to be erected over the Ohio Canal at West Main street, Massillon, Ohio. The estimated cost is \$10,000. Plans are on file in the county auditor's office.

The Director of Public Service, Cleveland, will receive bids November 28 for a second-hand 6.6 ampere D.-C. series arc dynamo for the municipal lighting plant, and arc lamp transformers, regulators and converters.

The City Council, Columbus, Ohio, has authorized the building of substation in connection with the municipal lighting and water plants. Equipment amounting to about \$12,000 will be purchased.

The Fremont Furnace Company, Fremont, Ohio, is planning the enlargement of its foundry, doubling the size of its molding department, and the erection of a warehouse, 40 x 100 ft.

The Ashtabula Bow Socket Company, Ashtabula, Ohio, has purchased a large building site and the building formerly occupied by the Veneer Package & Machine Company in order to largely increase its present manufacturing capacity.

A new plant will be established in East Liverpool, Ohio, for the manufacture of a patent metallic packing. Those back of the enterprise are L. M. Thomas, Joseph V. Clark, Fred Glenn, G. L. Brokaw and Edward Hoenig. The company will be capitalized at \$25,000. It is stated that the erection of a plant, including a steel castings foundry and machine shop, will be started shortly.

The Jeffrey Mfg. Company, Columbus, Ohio, manufacturer of mining, elevating, conveying and power transmission machinery and coal mine equipment, has opened another branch office. It is located at 1201 American Bank Building, Seattle, Wash., from which the company will handle its business in the Northwest. Percy E. Wright, the Seattle manager, is a sales engineer, connected with the home office for the past 10 years, but thoroughly conversant with the conditions in the Northwest territory, having been traveling in that part of the country for a number of years. The Jeffrey Company maintains 13 branch offices in the United States, as well as nearly 100 agencies in leading commercial centers all over the world.

It is reported that the American Can Company, Toledo, Ohio, will build an addition to its new plant

for the manufacture of steel barrels. The new building will be 80 x 200 ft.

The Cyclone Wire & Fence Company, Cleveland, has had plans prepared for a two-story factory building, 120 x 78 ft.

The Commercial Club, Greenville, Ohio, has closed a deal for the location of a plant in that city for the manufacture of pearl bottoms. Several factory buildings will be erected. It is stated that the plant will be moved to that city from Muscatine, Iowa.

A new oil fuel engine will be installed in the municipal lighting and water plant, Bryan, Ohio. The Council has authorized an issue of \$23,000 in bonds for the new equipment.

Cincinnati

CINCINNATI, OHIO, November 21, 1911.

No improvement in the machine tool trade developed last week, although it is reported that the inquiry was a trifle better. Both woodworking and electrical equipment are in fair demand, and second-hand machinery dealers are said to be doing a more satisfactory business.

As the date for opening the Panama Canal draws nearer, the interest in possible South American business grows. A number of local manufacturers, including machine tool builders, are doing some quiet investigating in that particular field, which heretofore has practically been neglected by most of them.

Much local interest is taken in a petition of the Baltimore & Ohio Railroad Company, now before the City Council, for permission to construct a switch from its main line to serve the factories and machine tool plants in the Camp Washington district. Practically all of these plants are without railroad connections, and if the proposed request is granted, many extensions to existing factories will be made, and probably the location of new industries in this particular section of the city will also result.

At a recent meeting of the creditors of the defunct Licking Rolling Company, Newport, Ky., Captain J. T. Hatfield was selected as trustee. The appraisers appointed are Joseph B. Andrews of the Andrews Steel Company, Newport; T. W. Sandford, Covington, and J. A. Sebastini of the Cincinnati Iron & Steel Company. A movement is on foot to have the plant taken out of bankruptcy and put in operation again.

The Triumph Electric Company, Oakley-Cincinnati, Ohio, has recently opened a district sales office in the Farmers' Bank Building, Pittsburgh, Pa., in charge of D. D. Gill. The Triumph Company was formerly represented in the Pittsburgh territory by the Doubleday-Hill Electric Company, but its rapidly increasing business there necessitated handling it through its own office.

The Cincinnati Continuation School methods continue to attract an increasing amount of attention from all over the country. Last week Dean J. H. Renshaw received special visits from the Boards of Education of Nashville, Tenn., and Toledo, Ohio, and it is understood that the members of these boards went home determined to establish schools in their respective cities, to be modeled along the lines of the Cincinnati institution.

The Cincinnati Lathe & Tool Company has completed the removal of its offices and shop equipment from the Spring Grove avenue building to its new plant in Oakley. The Ohio Pattern Works, occupying the second story of the old plant, will utilize the space vacated by the first-named company.

The Wildberg Box Company, now located on Ninth street, Cincinnati, has acquired a factory building on Evans street, near Gest street, into which it will move at an early date. Its manufacturing facilities will be greatly increased.

Architect L. Dittoe, Provident Bank Building, Cincinnati, has completed plans for the new factory of the Cincinnati Veneer Company, whose plant was recently partially destroyed by fire.

Collison-Pierson & Co., a newly incorporated firm at Charleston, W. Va., are reported to have plans under way for the erection of a large garage, in which will be a small repair shop.

The Crane-Hawley Company, plumbing specialty manufacturer, with headquarters in Chicago, is having plans prepared for a six-story reinforced concrete building to be erected on Ninth street, not far from its present location. The new structure will not be used for manufacturing purposes.

The M. Marcus Building Company, Cincinnati, has plans under way for a large reinforced concrete building to be erected on Reading road, in which the company expects to have its general offices.

Detroit

DETROIT, MICH., November 20, 1911.

Sales of machine tools have improved somewhat during the past week, but the improvement is due only to a better buying of single tools and small lots, large bookings being scarce in this market. The shop supply business is holding up well, drills being especially active, and dealers handling this class of equipment anticipate a good run of business for the remainder of the year. The demand for generators, motors, turbines and other electrical and hydro-electric machinery has picked up materially during November, and makers are enjoying a satisfactory business. The market for woodworking machinery has taken a decided slump. There is little call for boilers. Operators of foundries state that the demand for castings is increasing, but that business is still considerably below normal. Contrary to the unsettled state of affairs existing in many lines of industrial endeavor, the condition of the automobile trade is pronounced unusually good by a majority of important manufacturers, and while motor companies are not as heavy purchasers of machinery as they were last year, still, increased production in this industry is causing considerable buying. The volume of new building work reported this week shows a marked shrinkage.

The Garrison Electrical Heater Company has been incorporated with a capital stock of \$10,000 to manufacture electric specialties. Among the incorporators are P. C. Garrison, W. E. Standart and R. Boomer.

The Kelsey Wheel Company, manufacturer of automobile wheels, has commenced the erection of an extensive addition to its plant.

The Cadillac Motor Car Company has awarded contracts through R. F. Raseman, architect, for the construction of a large warehouse and a three-story brick power house adjoining its present plant. Provision has already been made for some of the equipment, which will include a large coal conveyor. The cost of the improvements is \$25,000.

The Barr Mfg. Company, maker of automobile parts and marine engines, has increased its capital stock from \$40,000 to \$55,000.

The Cutler Hub Company has been organized at Saginaw, Mich., for the manufacture of wooden hubs. The new company has acquired a factory site of three acres and will proceed at once with the erection of a plant. Initial purchases of mechanical equipment have already been made.

The All Metal Mfg. Company, Grand Rapids, Mich., has filed articles of incorporation, giving its capital stock at \$15,000. Among the stockholders are F. E. Miner, H. D. and E. A. Crandall. The new company will manufacture tools and equipment for the poultry trade.

The taxpayers of Kent City, Mich., have voted in favor of bonding for \$3,000 to provide for a water works system.

Reports to the effect that the Michigan United Railways are to be taken over by a syndicate headed by E. W. Clark of Philadelphia have received semi-official confirmation. The new management will expend a large sum in improvements throughout the system, including the electrifying of the present steam railway between Kalamazoo and Benton Harbor, Mich.

The Grand Rapids-Muskegon Power Company, Grand Rapids, Mich., is making extensive additions to its properties. The company is doubling the capacity of its steam power plant and is planning the erection and equipment of three substations in the near future. A rotary converter will be installed in the old Fulton street plant.

The Beach Mfg. Company, Charlotte, Mich., has begun the erection of a new heating and power plant, 42 x 42 ft., and one story.

The American Steel Belt Company has been organized at Pontiac, Mich., to manufacture steel and leather belting. The capital stock of the new company is given at \$50,000 and the principal stockholders are M. M. McGrath, D. L. Davis and R. K. Cronkhite. The company's product will probably be manufactured under contract at the start.

The Weis Mfg. Company, Monroe, Mich., maker of office furniture, has broken ground for the construction of a brick addition, three stories, 90 x 150 ft. The addition will be occupied by the cabinetmakers' department and the bindery.

The Battle Creek Table Company, Battle Creek, is making plans to enlarge its business, issue bonds and acquire a new plant. Negotiations for the new building are under way and it is probable that the mechan-

ical equipment of the company will be materially increased.

The Rose Machine Company, Grand Rapids, Mich., has increased its capital stock from \$20,000 to \$50,000. Plans are under way for a decided enlargement of the plant and its equipment. The company manufactures textile sewing machines.

The Ann Arbor Railroad Company will begin construction work early in the spring on a large new roundhouse, and will make extensive additions and improvements to its shops at Ann Arbor, Mich. With this end in view the company has acquired a site of 10 acres. It is understood that Master Mechanic C. P. Bergman will have charge of the improvements.

E. B. Gibford is equipping a small factory in Adrian, Mich., for the manufacture of cutlery specialties.

The Valley Grey Foundry Company, Saginaw, Mich., is building a two-story addition to its plant, 33 x 92 ft. The new addition will be used as a pattern loft, etc.

Fire in the plant of the Globe Mfg. Company, Battle Creek, Mich., maker of surgical instruments, caused damage of \$15,000. Among the machines damaged was a large dynamo and several buffing and plating machines.

Fire destroyed the plant of the Alpena Laundry Company, Alpena, Mich., causing a loss of \$11,000. Steps to resume operations will soon be taken and \$5,000 of laundry machinery will have to be replaced.

A tornado which struck Owosso, Mich., completely destroyed the large plant of the Estey Mfg. Company, maker of furniture, causing a loss of \$150,000. The plant will be rebuilt as soon as practicable. The recently completed addition to the factory of the Woodward Furniture Company was also destroyed at a loss of \$30,000, and the plant of the Owosso Mfg. Company, also a maker of furniture, was damaged to the extent of \$8,000. A large amount of woodworking machinery will have to be replaced and it is expected that the companies will soon be in a position to make purchases.

The Keeler Bros. Company, Grand Rapids, Mich., manufacturer of brass goods, plans the erection of an addition to its present plant.

George W. Miskin, Bay City, Mich., has acquired a factory building in Pontiac, Mich., and will equip it for the manufacture of launches.

A hoopmaking plant having an annual capacity of 2,000,000 hoops will be established at Lathrop, Mich., by Henry Luke of Cheboygan, Mich.

The Fisher Show Case Company has been incorporated at Grand Rapids, Mich. Those interested are O. E. Fisher, D. E. Fisher and W. Delney.

Aulsbrook & Jones, Sturgis, Mich., are in the market for a steam boiler for the addition in course of erection to its plant.

Indianapolis

INDIANAPOLIS, IND., November 21, 1911.

The Antidam Mfg. Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture auto parts. The directors are R. J. Irvin, J. M. Irvin and George R. Bott.

The Pedalmobile Company, Indianapolis, has been incorporated to manufacture pedalmobiles. The directors are George Herff, F. Minthorne and A. T. Purcell.

The General Specialty Company, Indianapolis, has been incorporated to do a manufacturing business. The directors are J. W. Coulter, R. E. Gregg and W. W. Gregg.

The Eagle Iron & Car Works, Terre Haute, Ind., was damaged by fire November 12 to the extent of \$10,000. The loss was mainly on the erecting room, core room and car sheds.

George Lenhart has been appointed receiver of the Star Motor Car Company, Indianapolis.

The sawmill and drykiln owned by John H. Moeller at Mt. Vernon, Ind., were burned November 16. The loss was estimated at \$20,000, partly insured.

The Twentieth Century Mixer Company, Connersville, Ind., has been incorporated with \$60,000 capital stock to manufacture concrete mixers, wheelbarrows, etc. The directors are William C. Bass, Jr., George C. Hicks, Jr., and R. J. Greenwood. The company is a reorganization. It moved from Bedford, Ind. Enlargements are contemplated.

The Otterbein Light & Power Company, Otterbein, Ind., has been incorporated with \$10,000 capital stock to supply electric current. The directors are R. H. Bolt, L. Leaming and R. W. Pierce.

The Anderson Valley Lumber & Spoke Company, St. Meinard, Ind., has been incorporated to operate a planing mill, etc. The directors are J. A. Greulich, N. A. James, S. W. Pitts, George Bechter and J. E. Vaal.

The Franklin Color Works, Franklin, Ind., has been incorporated with \$20,000 capital stock to manufacture paints. The directors are R. J. Mossop, Lowell Mossop and William Featherngill.

Adam Hunsberger purchased the R. Z. Snell Mfg. Company at South Bend, Ind., at receiver's sale for \$7,500. The company manufactures concrete mixers. Plans for enlarging the plant are being considered.

The Colfax Mfg. Company, South Bend, Ind., has purchased a new site and will erect on it a five-story brick factory that will double the capacity of the plant.

The Griffith Mfg. & Supply Company has been incorporated at Griffith, Ind., with \$20,000 capital stock to manufacture metal castings. The directors are B. B. Potter, W. J. McFarland, Alexander Jamieson, I. W. Hough and Joseph Grimmer.

The Commissioners of Laporte County, meeting at Laporte, Ind., on December 4 will let the contract for a bridge over the Kankakee River. Fred. A. Hunshear is county auditor.

The South

LOUISVILLE, KY., November 21, 1911.

Though the general tone of business is quiet, the situation is being maintained in a satisfactory manner, and dealers and manufacturers report that the outlook is favorable. Though reports from various sections indicate that the demand for boilers has fallen off, makers of electrical equipment say that the demand is very fair. It appears that nearly all buying is for immediate use, and that the needs of the future are not being anticipated. This has resulted in a lot of small orders, while exceptionally big ones are getting to be uncommon. The export trade in electrically driven tools has shown some improvement of late.

The Kentucky & Indiana Terminal Railroad Company, Louisville, which, as was recently announced, was planning the erection of large machine shops, has purchased the shops of the Baltimore & Ohio and the Southern Railway here, and will make some improvements in them. The general project has not been entirely abandoned, but has been given up for the present.

The work of organizing the Louisville Steel & Iron Company is proceeding, and it is hoped to have the plant in South Louisville in operation by January 1. It is expected that there will be some changes in and addition to the equipment. Officers of the new company will probably be elected before the end of this month.

The Model Generator Company, Louisville, maker of acetylene generators and welding equipment, has installed some special machines of its own design. They were built by Bertsch & Co., Cambridge City, Ind. The company has also enlarged its factory building.

The Tycrete Concrete Products Company, Louisville, is building a concrete block shop, and will install concrete mixers, block-making machines, etc.

The St. Matthews Ice & Cold Storage Company, St. Matthews, Ky., has increased its capital stock from \$45,000 to \$90,000, but will make no changes in its plant. The increase was for the purpose of taking care of the purchase of the plant of the Crescent Ice & Storage Company, Louisville, in which some minor changes will be made.

The Longest Bros. Company, Louisville, has completed the equipment of its shops for the manufacture of motor trucks. Gasoline cars are being built in three and five-ton sizes.

Matt Corcoran & Co., Louisville, have opened a shop for the manufacture of distillers' supplies and other copper goods.

The Anderson Sawmill & Veneer Company, Louisville, recently incorporated, takes over a going concern and will need no machinery.

The Kentucky Wagon Mfg. Company, Louisville, which recently took over the business of the Electric Vehicle Company, is enlarging its plant to provide for the manufacture of electric motor trucks. At present a 1,000-pound car is being made, but it is intended to make one-ton, two-ton and three-ton cars. Henry B. Hewett is general manager of this branch of the business.

H. J. Gutman & Co., Louisville, are remodeling a

building at Fourth and Walnut streets. Two electrically operated elevators are to be installed.

The railroad Metallic Tie Company, Princeton, Ky., reference to the organization of which was made recently in *The Iron Age*, has announced that it will let a contract to a machinery company for the manufacture of the ties. John W. Hollowell is president of the concern.

The Chesapeake & Ohio Railroad will require an electric pump for use in connection with a water plant it is equipping at Silver Grove, Ky., opposite Cincinnati, O.

The American Nicotine Company, Henderson, Ky., has been incorporated with \$200,000 capital stock for the manufacture of tobacco products. It will probably take over the plant of the Henderson Tobacco Extract Works, which has been planning enlargement. C. F. Gloystein, Henderson, is manager of this concern, and will be an officer of the new company.

Ashland, Ky., has decided to issue bonds for the purchase and improvement of the water works system. The municipality plans to spend about \$80,000 in installing new equipment in the pumping station and in making other improvements.

Russell, Ky., has sold \$75,000 of bonds, and will use the proceeds for the installation of a system of water works.

The Alvey Bros. Machinery Company, St. Louis, is the style of a new company organized by Gus Alvey, P. C. Alvey and others, of Elizabethtown, Ky., for the manufacture of conveying machinery. The company has no connection with the Alvey-Ferguson Company, Louisville and Cincinnati, which makes conveying machinery.

The Paducah Brewing Company, Paducah, Ky., has let contracts for the installation of considerable new equipment, including air compressors, cooling towers, etc.

The city of Covington, Ky., will let contracts this week for the installation of two 30-ton reduction furnaces for use in garbage incineration.

Lexington, Ky., business men are organizing a \$50,000 company, the object of which is to bring new factories to the city. Sites will be purchased by the company and given to new enterprises free.

The Bon Jellico Coal Company, recently organized at Knoxville, Tenn., for the development of Whitley County, Ky., coal lands, is making openings and preparing to begin operations. The machinery of the mines will be operated by electricity, and the company will erect a power plant of considerable proportions. E. B. Taylor, Williamsburg, Ky., is in charge of the purchases.

The spoke factory of John W. Little, Paducah, Ky., which was destroyed by fire recently, will be rebuilt. Wood-working equipment will be purchased.

The electric light plant of Campbellsville, Ky., was destroyed by fire November 15, the loss being \$30,000. Arrangements have not yet been made to rebuild, but it is understood that the plant will be replaced in the immediate future.

The Pond Creek Coal Company is being organized to take over 30,000 acres of coal lands in Pike county, Ky., purchased by Hayden, Stone & Co., Boston, with the intention of opening mines and developing immediately. The Island Creek Coal Company, Logan county, W. Va., will operate the property.

Cowan, Tenn., is planning the construction of a water works system and an electric light plant.

The Cumberland Marble Mill Company, Meadow, Tenn., is planning the installation of considerable new machinery in its plant, including four gang-saws, a derrick, a rubbing bed and a traveling crane.

The Morris Machine Works, Rockwood, Tenn., has begun operations, and is conducting a machine and blacksmith shop. E. W. Morris is manager.

The Nashville Armature Works, Nashville, Tenn., is in the market for three 110-volt motors and a 40-kw. belt-driven generator.

W. L. Riogan, Helena, Tenn., is inquiring for estimates on an electric light plant to be operated by water power for the use of a school building.

The Mount Morgan Coal Company, Williamsburg, Ky., is contemplating installing additional machinery in its coal mine.

The W. M. Lyles Mfg. Company, Crossville, Tenn., is in the market for a hoisting engine and boiler for use in logging work.

The Southern Railway, which is planning a number of improvements at Chattanooga, Tenn., will require a 10-ton pillar crane for freight handling. Contracts for equipment will probably be let from the Washington offices.

The expenditure of the Knoxville Light & Power Company, which will operate an electric plant at Knoxville, Tenn., with current from the Eastern Tennessee Power Company, will approximate \$400,000, it is reported.

The Chicago, Memphis & Gulf Railroad will probably erect a roundhouse and machine shops at Dyersburg, Tenn.

The city of Clarksville, Tenn., will receive bids until December 4 on the equipment for the new pumping station which it will erect. Address S. J. Lowe, superintendent water department, Clarksville.

The Cumberland Concrete Construction Company, Clarksville, Tenn., is in the market for power equipment for the operation of its concrete block plant.

The L. N. Dantzer Lumber Company, Moss Point, Miss., is to erect a paper pulp factory at an estimated cost of \$500,000.

J. B. Kelvin, Gary, Ind., and S. E. Light, Lebanon, Pa., are reported to be considering the establishment of a rolling mill at Sand Springs near Tulsa, Okla., for the manufacture of structural material.

Fort Smith, Ark., is to spend \$100,000 in the improvement of its water plant, and the installation of much new machinery in the pumping station. G. W. Kiersted is the engineer in charge.

F. G. Blair and Henry B. Foster have been granted a franchise for the erection of an electric-light and gas plant at Tuscaloosa, Ala.

The Tulsa Automobile & Mfg. Company, Tulsa, Okla., is receiving machinery for its automobile factory, which it is planned to start in operation January 1. The company has a capital stock of \$200,000, and expects to develop the Southwest as an automobile market.

Frank M. Morris and others will build and operate a water-works system at Ragland, Ala., under a franchise recently awarded.

Besser, Ala., is considering issuing bonds for the construction of a system of water-works.

Vicksburg, Miss., has under consideration a bond issue of \$400,000, the proceeds of which are to be used in the construction of a water system.

The Kansas City Southern Railway is reported to be planning the erection of a round-house and machine shops at Westville, Okla.

John A. Fiske, Cocoa, Fla., is organizing a company with \$60,000 capital stock and contemplates establishing a plant for the manufacture of unit bricks under the Sawyer patents. Machinery details are not yet prepared.

New Orleans, La., will open bids December 7 for furnishing a 6,000-kw. turbo-generator, 150-kw. converter and a seven-panel switchboard. Information can be had of F. S. Shields, secretary.

The statement in *The Iron Age* of November 2 regarding the machinery requirements of the Louisville Lead & Color Company, Louisville, was probably misleading. The machinery equipment required are paint mills operated by electric drive, a heating plant and an automatic sprinkler system.

St. Louis

ST. LOUIS, Mo., November 20, 1911.

The machine tool market continues to maintain its note of optimism and improvement which has prevailed in recent weeks, but this is chiefly due to the aggregate of the small orders, rather than to any large individual orders received. The requirements of small concerns continue to be the chief item of interest in the market, but there is a belief on the part of the dealers, from information at hand, that there will be a steady gain for some time to come.

The Broderick & Bascom Loggers' Supply Company has been incorporated in St. Louis with \$50,000 capital stock to handle a special branch of the business of the Broderick & Bascom Rope Company and to manufacture some of the specialties required in the new line of business. The stockholders are Charles E. Bascom, John K. Broderick, John J. Broderick, Joseph D. Bascom and H. J. Bailey, the last-named of Alton, Ill.

The Morris Lumber Company, St. Louis, with \$50,000 capital stock has been incorporated by Howard Cole, George J. Green, R. M. Morris and others to manufacture lumber and will equip a mill at once, at Clio and Kearney, Ark., and Bastrop, La.

Paul J. Scheller and H. J. Peckinpaugh have accepted

the gas franchise voted them by Edwardsville, Ill., and have completed the organization of a \$100,000 company which will at once equip a plant for the manufacture of gas.

The city of Springfield, Mo., voted November 16 to issue \$600,000 of bonds for the construction of a municipal waterworks plant with deep wells as the supply. The purpose is to do away with the present privately owned plant. It is likely, however, that the situation will be compromised.

The State Cabinet Company, Marietta, O., has leased quarters for the establishment of a branch factory and distributing station for the southwest for its product.

An entire block of ground near the center of the city has been leased by Henry Leschen, of the Leschen & Sons Rope Company, for the construction of a large building to be sub-divided and leased to automobile manufacturers repairers, accessories manufacturers, etc. It is understood that a large number of mechanically equipped plants have already been arranged for as lessees. The building will be about 150 x 400 ft. and six to ten stories.

The Superior Shoe Mfg. Company, with \$100,000 capital stock, the stockholders being Oscar W. Burg, Rudy E. Bloch and Joseph L. Kohner, will at once equip a plant in St. Louis with a capacity of 1,000 pairs of shoes per day.

The Whitman Agricultural Implement Company will expend about \$30,000 at once in extending its factory mechanical equipment and facilities.

The Laclede Gas Light Company, St. Louis, has sold \$818,000 of its treasury bonds for the purpose of extending its equipment. Part will also be expended upon a new office building for the company.

The Kirksville Gas, Heat & Light Company, Kirksville, Mo., has increased its capital stock from \$50,000 to \$100,000 for the purpose of increasing its equipment and capacity.

The Copeman Electric Stove Company, St. Louis, has been incorporated with \$30,000 capital stock by Allan Kennedy, C. A. Tilles and John F. Carr, and will equip a plant for the manufacture of electric heating appliances.

The Eagle Aerial Mfg. Company has been incorporated with \$100,000 capital stock for the manufacture of aeroplane equipment, etc., by Thomas H. and Robert F. Keppel and James Van Raalte.

The Richmore Mining Company, Joplin, Mo., has been incorporated with \$42,000 capital stock by Harry C. Neff, H. W. Hazell and Charles McDonald, and will equip a mining plant at once.

The Johnston Harvester Company, Peoria, Ill., has leased a building in St. Louis which it will equip at once as a branch plant and distribution station.

The Missouri Press Brick & Improvement Company will expend \$25,000 at once in extending its mechanical equipment for the manufacture of brick.

The Banner Rubber Company, St. Louis, has increased its capital stock from \$100,000 to \$400,000 for the purpose of equipping a much larger plant for the manufacture of automobile tires and other rubber goods.

The Blanton Company has decided to expend \$35,000 in increasing its mechanical equipment for manufacturing butterine.

The Olympia Coal Mining Company, Peoria, Ill., has been incorporated with \$100,000 capital stock, and will equip a coal mining plant on its property at once.

The Tower Grove Foundry Company has purchased additional frontage adjoining its present property on Hunt street, St. Louis, and will add a \$15,000 extension to its plant.

The Roth Tool Company, 2122 Choutou avenue, St. Louis, of which Edward B. Roth is president, has been organized with a capital stock of \$20,000, and has purchased the plant of the Former B. Roth Tool Company at the above address.

The city of Pacific, Mo., will open bids November 27 for the construction of a water works system. Information can be obtained from the city clerk.

The Columbia Novelty Mfg. Company will erect a two-story shop at No. 1435 North Eighth street, St. Louis, Mo., to cost \$1,800.

King City, Mo., has voted for an issue of bonds to provide funds for the building and equipment of an electric light plant.

The Omaha & Council Bluffs Street Railway Company has taken out a permit for the erection of car shops at Twenty-seventh and Ohio streets, Omaha, Neb., to cost \$20,000.

Texas

AUSTIN, TEX., November 18, 1911.

Cold weather of unprecedented severity for this time of the year prevailed over nearly all of the cotton belt during the early part of the week. The freezing temperature put a stop to further cotton production except in the extreme southern portion of the state. The cotton holding movement shows evidence of increased support and business remains dull and inactive pending an improvement in cotton prices or a turning loose of the product which is now being held. Notwithstanding the depressed condition of the general business situation there is considerable doing in the machinery line, particularly as it relates to manufacturing enterprises. The situation in Mexico is again becoming menacing, due to alleged revolutionary plots against the new government. There is now little hope of machinery trade in that country improving for some time to come.

The Dallas Electric Light & Power Company, Dallas, will nearly double the capacity of its power plant. The present capacity of the plant is 5800 kw. With the installation of additional machinery 5000 kw. will be added. Power from this plant is used to operate the street railway system in Dallas.

Pumps and other machinery will be installed in the municipal water and light plant at Sherman Harvey McDuffie is superintendent.

A syndicate of Michigan men composed of Hudson T. Morton and J. H. Taylor, of Ann Arbor; R. G. Steele, of St. Johns; Andrew Fyfe, of Grand Rapids; F. E. Turrell, William T. Utley and H. M. Wallace, of Detroit, will install a gas producing plant and distributing system at Waxahachie, Texas. The City Council has granted a franchise for the improvement.

The W. H. Irvin Ice Factory, Incorporated, has been formed at Houston with a capital stock of \$50,000. The incorporators are W. H. Irwin, John Hazard and Robert Terry.

The Rockdale Coal Company has been formed at Rockdale, with a capital stock of \$30,000 for the purpose of operating coal mines. The incorporators are E. A. Camp, William Wells and H. E. Rowlett.

The Palacios, San Antonio & Pecos Valley Railroad Company has made a proposition to the citizens of Yoakum, Texas, to locate its proposed general shops and offices there. It stipulates that this will be done if a bonus of \$50,000 and free ground for terminals and necessary buildings are donated. H. L. Montandon is chief engineer.

The Western Bridge Company has been formed at Sherman, with a capital stock of \$10,000. The incorporators are W. H. C. Greer, Bert Hahn, T. H. Dunn and others.

The Hancock Electric Company has been formed at Dallas with a capital stock of \$5,000. The incorporators are W. L. Hancock, Abe Hyman and J. B. Adoue, Jr.

The Stone & Webster engineering corporation interests which recently took over the electric light and power plant at Beaumont, has organized the Beaumont Electric Light & Power Company with a capital stock of \$880,000 to operate the present plant, and to make important enlargements. The incorporators are Marshall M. Phinney, of Boston; C. W. Kellogg, Jr., of Dallas; E. J. Emerson, of Beaumont; L. C. Bradley, of Galveston; David Daly, Harry L. Harding and W. H. Stevens, of Houston. It is reported that the new company will construct an interurban electric railway between Beaumont and Port Arthur, 25 miles.

The Cotton Belt Gin & Lumber Company has been formed at Lufkin with a capital stock of \$20,000. The incorporators are I. D. Fairchilds, T. W. Largent, E. F. Dunlap and others.

C. S. Karely, of Portland, is promoting the organization of a company with a capital stock of \$45,000, to establish a factory at Corpus Christi, for manufacturing paper bottles.

The waterworks committee of the City Council, of Marlin, has recommended that the city purchase the interests and lease of A. R. Wright in the local waterworks plant and distributing system and that bonds be issued to the amount of \$20,000 for enlarging and improving the plant. The matter is now under consideration by the City Council.

The city of Georgetown is spending \$50,000 in the betterment of the water and light plant. An increased water supply has been developed by sinking a well.

A. H. Wilborn, of Memphis, and A. C. Wilborn, of Dallas, have completed the erection of a factory at Amarillo, for manufacturing metal tanks and galvanized corrugated iron road culverts.

Armour & Co. are installing a cold storage plant at Stamford, at a cost of \$10,000.

The City Council of Harlingen, will soon begin the installation of a waterworks plant and distributing system and an electric light and power plant. Bonds for these proposed improvements have been issued. The work of construction will be superintended by the firm of Randall, Lovegrove and Wyman, of Houston.

The Del Rio Water Company is installing a 200,000-gal. tank and making other improvements to its waterworks system at Del Rio.

The Southwestern Sugar Company has been investigating the situation at Colonia Dublan, state of Chihuahua, Mexico, with a view of erecting a large factory for the manufacture of beet sugar.

The Corralitis Cattle Company is constructing a dam across the river near Colonia Dublan, Mexico, and will install pumping machinery for the irrigation of a large tract of land.

One of the largest electric power projects in Mexico is that of the Compania Hydro-Elctrica Mexicana, S. A., of Monterey, Mexico, which was recently formed with a capital stock of \$30,000,000. It proposes to install hydroelectric plants on the Rio Blanco in the state of Nuevo Leon and Tamaulipas and on the Rio de los Marangos in the state of San Luis Potosi. The company has already acquired concessions from the federal and state governments for these proposed plants. It expects to develop about 60,000-hp. which it will transmit to Monterey, Tampico, San Luis Potosi, Victoria, Montemorelos, Linares and other towns, covering a big scope of territory in northern and central Mexico. The surveys for the necessary dams and transmission lines are now being made. The officers of the company are Thomas Makinson Sanders, president; Frederick James Robinson, vice-president; Thomas Phillips, treasurer; Jose Romero, manager and Manuel Migoni, secretary. It is stated that construction work will be started on the different plants within the next few weeks and that it is expected that electric power will be available within the next 12 to 18 months.

The Pacific Coast

SAN FRANCISCO, CAL., November 14, 1911.

While a somewhat better feeling is manifest in the machinery trade, the volume of machine tool business shows little improvement. Both sales and inquiries of individual importance are lacking, and while a few operators are planning general improvements no general action is likely to be taken before the end of the year. Small single-tool orders, however, are coming out in somewhat better shape than last month. A good many machine shops are preparing to move into new quarters, and some new equipment will be required, but such improvements are confined to as narrow limits as possible.

The demand for some classes of machinery of local manufacture is very slow, mining equipment being especially quiet at present. The business of the past summer in this line has been considerably below expectations. The larger shipbuilding shops, also, are operating far below capacity, though builders of small boats and marine gas engines are busy. Notwithstanding the approach of winter, the demand for irrigating equipment is increasing, several shops being well filled up with small work of this nature. Some oil-well supply business is coming to this market, but shops in the oil fields have little work on hand, and are buying practically nothing in the way of new tools. Woodworking machinery remains very dull. A number of new inquiries are coming out for road machinery, and there is more movement in quarry equipment than for several months past. Some improvement work is in progress at California cement plants, and one new plant will probably be installed during the winter. Electrical equipment of all kinds is moving freely. Important extensions are being made to both power transmission and electric traction lines throughout the state.

The Benicia Iron Works, Benicia, Cal., will start work shortly on a large woodworking shop.

The Reliance Foundry Company has been incorporated in San Francisco, with a capital stock of \$30,000, by J. S. Welbank, H. I. Cruzan and T. A. Sexton.

The Island Investment Company, Honolulu, T. H., has let a contract for machinery for a large steam-electric generating plant to be erected on the island of Maui. Oil fuel will be used.

The Southern Pacific Railroad and the American-Hawaiian Steamship Company are preparing to install

a pumping plant and salt-water fire-fighting system at the outer end of the Oakland long wharf.

The Monterey County Gas & Electric Company is preparing to increase the capacity of its pumping plant at Salinas, Cal.

The town of Bakersfield, Cal., is considering the installation of a rock crusher and a number of gravel cars.

The City Electric Company, San Francisco, is preparing plans for a new sub-station on Folsom street near Sixth.

The Associated Milling Company, recently organized at Manhattan, Nev., intends to install a new ore mill, including 10 stamps, tube mills, etc.

A contract has been let for the installation of 20 additional stamps at the ore mill of the Alaska mine at Pike City, Cal.

The San Juan Portland Cement Company, San Juan, Cal., is expected to complete its plant within the next few months. Most of the machinery was delivered some time ago, but has never been set up.

The Main Brass & Mfg. Company has been incorporated at Los Angeles, with a capital stock of \$25,000, by Herbert, Charles and Henry Ovendale and Lawrence Macomber.

The Brisco Iron Works, manufacturing deep-well pumps, is considering the establishment of a foundry and shop at Porterville, Cal.

The city of Los Angeles has made such progress on its Owens River aqueduct that a large amount of the machinery used in the project is no longer required, and some of this equipment is now being placed on the market. The sale has been authorized of six Holt caterpillar traction engines. It is reported that the city will open a store for the sale of its used machinery.

Grier & Hawley, of Sacramento, Cal., have ordered a Class 14 Bucyrus excavator, with a 1½-yard bucket and a 60-ft. boom.

The town of Whittier, Cal., has under consideration bids for a steam road roller.

Plans are being prepared for a warehouse building for the Meese & Gottfried Company, local machinery merchants, to be erected at 19th and Harrison streets.

The Union Iron Works, this city, is now assembling a steel caisson for the Pearl Harbor drydock, said to be the largest ever constructed on the Pacific Coast.

The Western Foundry Company is preparing to put up a new cupola on Folsom street near Fifth.

A large pumping plant is to be installed shortly at the local works of the American Steel & Wire Company on Harrison street near Fifteenth.

S. G. Beach, Placerville, Cal., is putting on the market a lot of second-hand sawmill equipment from the Mountain Mill, which he recently purchased.

The California Glass Insulator Company, Los Angeles, Cal., has secured a site at Long Beach, Cal., and is having plans prepared for a plant to be erected there for the manufacture of pressed and blown glassware. Most of the equipment has been purchased, but the company will be in the market from time to time for machinery for the manufacture of its product.

The municipality of Elma, Wash., through C. M. Long, town clerk, is advertising for bids to be opened December 5 for the construction of a water-works and pumping plant complete.

Eastern Canada

TORONTO, ONT., November 18, 1911.

A change in the weather has interfered with the activity of outdoor work and has caused some falling off in the demand on that account. Most of the factories report business good, as there has been a considerable volume of orders for future delivery in most cases. The railway equipment manufacturers are fully employed, and will be throughout the winter. In many lines of machinery and equipment supplies prices are easier than they were even when trade was duller in the United States. There is more complaint than there was then of price-cutting on the part of American competitors. Still it seems to be the opinion that Canadian manufacturers are getting a larger proportion of the home business than they ever had before.

The Seymour Power & Electric Company is about to erect a substation at Napanee, Ont.

The Electric Power Company, Toronto, is building a power house at Trenton, Ont.

The Commercial Construction Company, Sudbury, Ont., has been incorporated with a capital stock of \$40,000 to carry on a bridge-building business.

The Thomas Pink Company's office, storerooms, engine room and machine shop at Pembroke, Ont., have been burned down. Total loss, \$50,000. The company will rebuild at once.

The Rock City Tobacco Company, Quebec, Que., will build a large addition to its tobacco factory.

An addition to the Chateau Frontenac, Quebec, that will cost \$1,000,000, is being planned by the Canadian Pacific Railway Company.

The factory of the Perth Flax & Cordage Company, Stratford, Ont., has been acquired by the Bennewitz Mfg. Company, which is to operate there.

A by-law to raise \$100,000 to build a concrete reservoir, install electric pumps, etc., is to be submitted to the ratepayers of Berlin, Ont., very shortly.

James Fowler is negotiating with the town of Oakville, Ont., for the establishing of a factory there to make electric motors, telephone supplies, etc.

The Montreal Witness quotes T. Cantlev, general manager of the Nova Scotia Steel & Coal Company, as follows: "Our new hydraulic forging plant is now almost completely set up. It is a fine specimen, built in Europe, and will cost us not much under \$400,000. Each such addition places the company in a stronger and more independent position. Apart from the bad effects of ruinous price-cutting in the United States, business is good, with prospects bright."

The Guelph Stove Company, Guelph, Ont., has made an arrangement with the City Council for the enlargement of its plant and operations.

The Grand Trunk Railway Company is anxious to secure 750 electrical hp. from Kingston, Ont., to work a rolling and crushing plant which it intends to establish two miles east of that city.

The firm of Logan Bros., Ltd., Renfrew, Ont., woolen and knitting manufacturers, is about to install a new plant in order to keep pace with its greatly increased business.

A charter of incorporation has been granted to the British North American Drydock & Shipbuilding Company, Ltd., with a capital stock of \$1,000,000. All the signatories in the charter are Quebec City men. They are as follows: Philippe Bazin, J. F. Burstall, V. Cahateauvert, William Dobell, Nap. Drouin, J. B. Letellier, William Price, J. T. Ross and William Shaw. It is understood that this company will immediately make application for the subsidies for the new construction at Quebec of a very large drydock, and upon formal acceptance of the scheme by the government the work will begin at once.

The Stewart Sheafloading Company, Winnipeg, is being negotiated with for establishing a large factory in Guelph, Ont., to cost \$100,000.

The municipality of Point Claire, Que., will require iron pipe, engine and boiler, pump, dynamos, etc., for water works plant it is putting in.

The Town Council of Tilbury, Ont., has under consideration a proposal from H. H. Hallett and associate to establish a brick and tile factory in that town.

The E. B. Eddy Company's proposed improvements of power plant, etc., at Hull, Que., will, it is estimated, cost \$500,000.

The National Drug & Chemical Company, Toronto, is preparing to erect a store and warehouse in Hamilton, Ont., to cost \$50,000.

A merger has been formed, with Kingsville, Ont., as the center, of the Volcaine Company of Windsor, Ont.; the United Fuel Supply and Ridgeway Gas Company and the Northern Pipe Line Company.

The Robinson Bros. Cork Company is extending its plant at Port Colborne, Ont.

The municipality of Port Colborne, Ont., is negotiating for a branch of an American steel manufacturing concern that would employ 200 men.

H. Vineberg & Co. are erecting a factory to cost \$200,000 in Montreal.

J. C. Wilson & Co., Montreal, are building offices and warehouse to cost \$125,000.

The town of Goderich is in negotiation with L. P. Brodie, who proposes to establish mammoth salt works there and produce electrical power for supplying the town.

G. D. Memberg & Sons, Hamilton, Ont., are about to install mattress-making machinery to cost about \$15,000.

The Russell Motor Car Company, Toronto, is building a factory in that city to cost \$30,000.

Henderson Black & J. Connors are about to build an addition to their binding-twine factory in Walkerton, Ont.

Canadian Motors, Ltd., is putting up a factory at Galt, Ont., to cost \$4,000.

The International Harvester Company has taken out permits to put up additional factory buildings in Hamilton, Ont.

The Laidlaw Bale Tie Company, Hamilton, Ont., is putting up a \$30,000 factory.

The Monarch Knitting Company, St. Thomas, Ont., is erecting a \$60,000 addition to its present plant. The new building will be equipped with machinery for producing 600,000 lb. of worsted yarns per year.

The Roc-Mac Company, F. H. Keefer, president, Port Arthur, Ont., manufacturer of paving materials and liquid binders, will build a plant at that place, comprised of a crushing mill, a hydrated lime mill, a chemical and analytical laboratory, a cooperage shop and office building, to cost \$40,000. The company has established a branch plant at North Tonawanda, N. Y.

The Crown Gypsum Company, Lythmore, Ont., has awarded a contract to Dick & Sons, Welland, Ont., for a factory, 70 x 244 ft., to replace its plant recently burned. All modern improvements will be installed. J. H. White is superintendent.

Western Canada

WINNIPEG, MAN., November 15, 1911.

Winter has now set in here, with more strenuous weather than the average for the middle of November. Consequently building on small structures has fallen off. There is, however, considerable work being done on large buildings. In the prairie country industrial operations are usually quiet for a couple of months in the frostiest part of the winter, but on the Pacific coast, where cold does not interfere much, there is considerable expansion in contemplation for this winter.

In Calgary, where the Canadian Pacific Railway Company is about to erect its western machine and car shops, surveyors have been at work laying out the site and placing the stakes for the excavation work. According to the company's agreement with the city, work is to be started immediately, or not later than one month after the ratification of the agreement.

A report from Vancouver says that a number of coast and mountain mill owners are planning additions and improvements to their plants, to be carried out during the winter if the prairie demand for lumber gives promise of briskness.

The plant of the Canadian Pacific Lumber Company at Port Moody, B. C., is being improved by the placing of two new 60-in. x 16-ft. boilers and a large gang saw. The output of the mill will be increased as a result.

The Canadian Puget Sound Lumber Company, Ltd., has carried into effect many improvements calculated to increase the daily cut of lumber and effect a substantial saving in operating expenses of the Sayward sawmill at Victoria, B. C., and is now turning attention to the sash and door factory, which is to be enlarged and made up to date by the addition of fast-speed machines.

The Canada Cement Company is building at Winnipeg an immense plant for the manufacture of cement. Wm. Clark & Co., North Battleford, Sask., are incorporating, and are preparing plans for a foundry and machine shop.

The B. C. Telephone Company, Vancouver, B. C., has prepared plans for a new exchange in that city. The amount to be expended by the company on its scheme of improvements is in excess of \$2,000,000.

The Great West Saddlery Company will put up a three-story block at Lethbridge, Alberta.

The Canada Iron Corporation will erect a gas plant in connection with its works at Fort William, Ont. The estimated cost is \$50,000.

Two units of 10,000 kw. each are now installed at Stave Falls, near Vancouver, B. C., by the Western Canada Power Company.

The Alberta British Columbia Lumber Company, Cranbrook, B. C., has been incorporated with a capital stock of \$50,000.

The Capilano Rock & Gravel Company, Vancouver, B. C., has been incorporated with a capital stock of \$250,000.

The International Harvester Company, Hamilton, Ont., has purchased a site at Lethbridge, Alberta, on which it will erect a \$100,000 warehouse.

The North Battleford Mfg. Company, North Battleford, Sask., has increased its capital stock to \$100,000, and will erect a new factory.

The city engineer of Calgary, Alberta, has prepared plans for a bridge to cost \$100,000.

The Regina, Sask., offices and warehouse of the American-Abell Engine & Thresher Company were

destroyed by fire recently, the loss amounting to \$160,000. A great stock of implements was destroyed.

The Granby Smelting Company is building large power works at Goose Bay, B. C.

The plant the Carson Hygienic Dairy Company is erecting in Winnipeg is to cost \$250,000.

The Heshner Marble Company is putting up a \$50,000 warehouse in Calgary, Alberta.

The Mueller Mfg. Company, which makes water works and plumbing supplies at Decatur, Ill., is negotiating for a site and privileges for the location of a large Canadian branch plant in Port Arthur, Ont.

Government Purchases

WASHINGTON, D. C., November 20, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids December 12, under schedule 4082 for one traveling crane for delivery to Pearl Harbor, Hawaii; schedule 4083, one surface condenser for Charleston, S. C.; schedule 4103, one universal milling machine for Portsmouth, N. H., and schedule 4102, for one car puller, eight transformers and spark gaps for Brooklyn, N. Y.

The Paymaster General, Navy Department, Washington, will open bids, December 12, under schedule 4071, for one 20-ton, four-motor electric traveling crane for Mare Island, Cal.; schedule 4072, one electric motor truck and under schedule 4073 two oil burning furnaces for Puget Sound.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids November 14 for material and supplies for the navy yards as follows:

Schedule 4030, class 88, one combined stake riveter and punch—Bidder 84, Fairbanks Company, Washington, D. C., \$788; 103, Hilles & Jones Company, Wilmington, Del., \$795; 151, Manning, Maxwell & Moore, New York, \$1,034; 158, New Doty Mfg. Company, Janesville, Wis., \$625; 162, Niles-Gement-Pond Company, New York, \$970; 183, Joseph T. Ryerson & Son, Chicago, Ill., \$805; 191, Scully Steel & Iron Company, Chicago, Ill., \$710; 210, Toledo Machine & Tool Company, Toledo, Ohio, \$825; 241, Wickes Bros., Saginaw, Mich., \$719 and \$742; 58, Covington Machine Company, Covington, Va., \$750.

Schedule 4031, class 89, one electrolytic oxygen-hydrogen generating plant—Bidder 119, International Oxygen Company, New York, \$11,420.

Schedule 4032, class 91, gun firing equipment and interior communication motor generators—Bidder 82, Fort Wayne Electrical Works, Fort Wayne, Ind., \$1,492; 107, Holtzer-Cabot Electric Company, Brookline, Mass., \$1,413.33; 160, Newport News Shipbuilding & Dry Dock Company, Newport News, Va., \$2,267.57.

Cement Production in 1910

Ernest F. Burchard, of the United States Geological Survey, reports that in 1910 the production of Portland cement in this country reached the enormous total of 76,549,951 barrels, with a value of \$68,205,800. This is equivalent to 12,986,152 gross tons, valued at \$5.25 a ton. It is an increase over the output for 1909 of 11,558,520 barrels, or nearly 18 per cent., and an increase in value of \$15,347,446, or more than 29 per cent. This increase alone is greater than the total output of Portland cement in 1900. In addition to Portland cement there was also produced last year 1,139,239 barrels of natural cement and 95,951 barrels of puzzolan cement, a total of 77,785,141 barrels.

The price of Portland cement in 1910 was as low as 73 cents a barrel in some places, the average for the United States being 89.1 cents a barrel. In 1890 the average price was over \$2 a barrel and as late as 1903 it was \$1.24 a barrel.

Mr. Burchard remarks that measured by the capital invested the cement industry is one of the world's three great extractive industries. In capital employed it apparently far outranks the gold-mining industry of the United States, including Alaska, as well as the copper industry. Only coal and iron stand ahead of it.

The following table of the production of Portland cement in the United States from 1880 to 1910 shows the healthy growth of the industry and also the decrease in prices:

Years.	Barrels.	Average price per barrel.
1880	42,000	\$3.00
1890	335,500	2.09
1895	990,324	1.60
1900	8,482,020	1.09
1905	35,246,812	.94
1909	64,991,431	.81
1910	76,549,951	.89

A copy of the report may be obtained on application to the Director of the Geological Survey, Washington, D. C.

New Tools and Appliances

This is essentially a news department for which information is invited.

Repair Outfit for Steel Tape.—A recent product of the Pittsburgh Instrument & Machine Company, Pittsburgh, Pa., is a combination steel tape punch, shears and riveter, made in handy form for repairing broken steel tapes. The ends of the two adjacent portions are squared by the shears, the holes for the rivets are punched and the rivets put in in one operation without removing the tape from the tool.

Self-Opening and Adjustable Die-Head.—A new type of automatic opening die which is especially intended for use in the turret of Cleveland automatic screw machines, but can also be employed in other automatic or semi-automatic machines, the operation of which is similar, has been placed on the market by the Geometric Tool Company, New Haven, Conn. Five sizes of die are made to cut threads having a maximum diameter of 5/16, 9/16, 3/4, 1, and 1 1/4 in. respectively. Splines of liberal size hold the dies at one side of the opening in which they fit, and cams engaging slots in the inner faces of the dies regulate their position with relation to the diameter of the thread to be cut. The die-head is not held rigidly, but is supported by a spring mechanism between the head and the shank, thus enabling the chasers to compensate for any inaccuracy of turret adjustment. The travel of the turret determines the length of thread to be cut while a lock-nut adjustment at the side of the head enables it to be more closely controlled. A micrometer adjustment at one side of the head gives the necessary variation in the diameter of the threads for a tight or loose-fitting screw. A closing pin causes the chasers to close automatically by the rotation of the turret and operates in connection with a closing bar mounted on the turret housings. In addition to the five sizes mentioned other sizes can be furnished when ordered.

Milling Attachment for Cutting Oil Grooves.—The National Machine Tool Company, 128 Opera place, Cincinnati, Ohio, has developed a milling machine attachment for cutting the oil grooves in loose pulleys at the rate of approximately 6 in. per minute. An eccentric bushing is furnished with the tool, as well as four shoes, which enable to different diameters of holes to be cut, the change from one size to another being made by removing one screw. If desired, this attachment can be used on a drill press in practically the same way as the company's key-seating tool.

Continuous Miller.—A new model of continuous milling machine has been developed by the Becker Milling Machine Company, Hyde Park, Mass. The construction of the machine in general is the same as the company's regular model C, the only difference being in the table construction. The adjustment of the table toward the spindle is by means of a longitudinal slide, the cross slide having been omitted. This construction enables the machine to be used for surface milling in a straight line as well as for strictly rotary work, which is the field the miller is intended to cover. One of the recent jobs handled was the milling of sad irons. For doing this work a fixture having a capacity of 14 castings was clamped on the circular table, which is 30 in. in diameter. In doing this work the table made a complete revolution in from 3 to 4 min.

Long Stroke Riveter.—The Hemming Brothers Company, New Haven, Conn., is building a long-stroke riveter which is capable of producing any desired shape of head, filling a countersink, making perfectly tight joints or riveting so lightly as to permit the parts joined to swivel. The variation in the force of the blow for doing the different kinds of work is regulated by pressure on a foot treadle. Where both ends of a rivet have to be headed simultaneously, the machine is equipped with a lower revolving fixture secured to the horizontal table and striking light reciprocal blows from below.

Textile Roll Planer.—The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has recently built a planer for textile rolls. The table of the machine is 30 in. wide and 10 ft. long, and is equipped with multiple

automatic indexing centers. On the return stroke the 12 tools with which the planer is furnished are lifted out of the cut by a lever located on the right side.

Self-Oiling Pulleys.—For use where the service is severe, Edward Cunningham & Co., Canton, Mass., have placed on the market a new type of self-oiling pulley in which centrifugal force is employed to lubricate it. A central reservoir is cored out of the pulley hub and as the pulley revolves the oil is thrown outward in the oil chamber by centrifugal force and passes down through oil tubes secured in a member fastened to the shaft. These tubes deflect the lubricant and it is forced by inertia down through them to the oil grooves on the shaft and returns to the oil chamber by centrifugal force.

Adjustable Triangle.—A 45-deg. triangle arranged so that one end of the hypotenuse can be slid along the base to make any angle with it between 45 and 90 deg., while at the same time the hypotenuse makes the complementary angle with the upright leg, has been placed on the market by the Adjustable Triangle Company, P. O. Box 23, Station H, New York, N. Y. The base of the triangle has a slot parallel to the ruling edges in which a round pin fixed to the end of the hypotenuse slides. The upper end of this member is also slotted and slides on a pin fixed to the end of the upright leg. The blades or legs of the triangle are made of maple wood and the metal fittings are of German silver. The end of the pin projecting up through the slot is threaded and carries a thin modified wing-nut, a quarter turn of which is sufficient to free the pin or bind it firmly at any point along the slot. The upper end of the movable blade is cut off along a flat curve so that it does not project beyond the outer edge of the upright in any position, and this enables the triangle to be used with either the base or the upright against the T-square blade. The upper edge of the base is graduated in half degrees and facilitates setting.

Automatic Die-Head.—For use on hand and automatic screw machines, for cutting threads of standard and special pitches or pipe threads of any size within its capacity, the National Tool Company, Cleveland, Ohio, has brought out an adjustable self-opening and self-closing die-head. The chasers are mounted in carriers which slide in a grooved disk that is contained in a shell screwed to the shank. A hardened and ground knurled adjusting ring tapered on the inside is fitted over this shell and is threaded to engage with it. Hardened steel balls are interposed between the ring and the chaser carriers. This knurled ring controls the adjustment of the dies for threads of various diameters. When mounted in the turret the die is opened by stopping the travel of the turret slide and as soon as the turret comes to a stop the inner die-block is drawn forward by the action of the thread which is being cut and this movement brings the recesses in the chaser carries opposite the steel balls and thus permits the chasers which are under the tension of springs to open. The length of thread is governed by setting the stop on the turret slide. The dies are closed by a latch which when the dies are opened extends across the center of the head. The turret advances until this latch comes in contact with the end of the stock to be threaded which forces the die-block and the chasers back to the exact threading position, the dies being shifted inward by the hardened balls and the latch automatically swinging out of the way while the chasers are closing. With this die no special fixtures are required to close it, and threads can be cut close to a shoulder. Since the shank is hollow any length of thread within the range of the turret slide travel can be cut. In the construction of the die care has been taken to avoid having small parts on the exterior where they are apt to be broken and the die cannot be rendered inoperative by any chips or dirt which might get into the working parts. Seven sizes of die are made and the capacity ranges from 3/8 to 2 in.

Foot Power Grinder.—The Carborundum Company, Niagara Falls, N. Y., has just brought out a foot-power grinder which is operated by a one-foot treadle and a spiral gear shaft. Ball bearings are employed and the grinder is equipped with two 7-in. carborundum wheels, one for coarse grinding and the other for fine. Malleable iron is used in the construction of the parts subjected to the greatest strain. The over-all height of the machine is 40 in. and the weight is 68 lb.

Current Metal Prices.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Refined iron:		Nos. 22 and 24.....		Straits pig	
1 to 1½ in. round and square.....		No. 26.....		Lake ingot	
1½ to 4 in. x ½ to 1 in.		No. 28.....		Electrolytic	
1½ to 4 in. x ½ to 3-1				Casting	
Rods—% and 11-16 round and square.....					
Angles:		Corrugated Roofing—		Spelter—	
3 in. x ¼ in. and larger.....		2½ in. corrugated.....		Western	
3 in. x 3-16 in. and ¼ in.		No. 24.....		Zinc—	
1½ to 2½ in. x ½ in.		No. 26.....		No. 9, base, casks.....	
1½ to 2½ in. x 3-16 in. and thicker.....		No. 28.....		Lead—	
1 to 1½ in. x 3-16 in.				American pig	
1 to 1½ in. x ¼ in.				Bar	
¾ x ¼ in.				Soldier—	
¾ in. x ¼ in.				½ & ¾, guaranteed.....	
¾ x 3-32 in.				No. 1	
Tees:				Refined	
1 in.				Prices of solder indicated by private brand vary	
1½ in.				according to composition.	
1½ to 2½ x ¼ in.				Antimony—	
1½ to 2½ x 3-16 in.				Cookson	
3 in. and larger.....				Halletts	
Beams, 3 in. and larger.....				Other brands	
Channels, 3 in. and larger.....				Bismuth—	
Bands—1½ to 6 x 6-16 to No. 8.....				Per lb	
Burden's "H. B. & S." iron, base price.....				Aluminum—	
"Burden's Best" iron, base price.....				No. 1 aluminum (guaranteed over 99% pure), in	
Norway bars				ingots for remelting.....	
				Rods and Wire.....	
				Sheets	
				Old Metals—	
				Dealers' Purchasing Prices Paid in New York.	
				Copper, heavy and crucible.....	
				Copper, heavy and wire.....	
				Copper, light and bottoms.....	
				Brass, heavy	
				Brass, light	
				Heavy machine composition.....	
				Clean brass turnings.....	
				Composition turnings.....	
				Lead, heavy	
				Lead, tea	
				Zinc, scrap	

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